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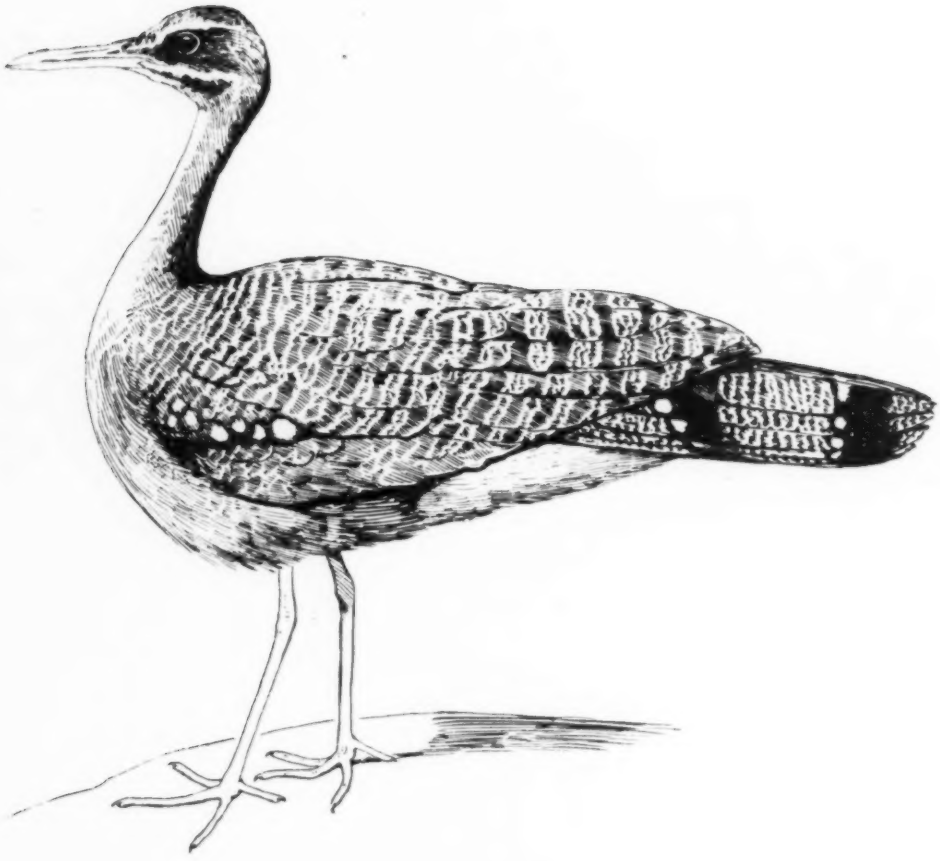

SUN-BITTERN
Eurypyga helias

From a drawing made by George Miksch Sutton for John Wiley and Sons and first published here by their kind permission.

THE FAMILY EURYPYGIDAE: A REVIEW

BY CARL D. RIGGS

AS with many neotropical bird groups, little has been published on the family of Sun-bitterns (Eurypygidae), and the findings of one author often seem to contradict the findings of another. It seems worth while, therefore, to summarize the various reports for the benefit of those bird students who are trying to complete our knowledge of neotropical ornithology.

The family consists of a single species, *Eurypyga helias*, in which are recognized three subspecies, *major*, *meridionalis*, and *helias;* these occupy tropical Central and South America from the Caribbean slopes of Guatemala southward to south-central Peru, eastern Bolivia, and northern and central Brazil, the southern limits being southern Goyaz and Piauhy (Peters, 1934:215–216).

Sun-bitterns inhabit the dense tropical forests of the coast, as well as those of the interior (Cabanis, 1848:752), and are most commonly found along the wooded, muddy banks of rivers and smaller streams, around springs and ponds, and in boggy or swampy areas. In Venezuela, according to Delacour (1923:140), they are especially numerous along the smaller streams, "where they live on the mud, generally under the cover of trees." Cabanis (1848:752) reports that in British Guiana they frequent sunny places, particularly along the banks of rivers. Skutch (1946:453) observed a Sun-bittern walking "deliberately" over the surfaces of a steeply inclined rock face between two pools in a stream, picking small objects from among the rocks, and flying from boulder to boulder. The Sun-bittern is usually seen on the ground, but if disturbed it sometimes takes refuge in the lower branches of trees (Carriker, 1910:426). To combine the descriptions of various authors —the Sun-bittern is a slender, graceful bird, walking with slow, precise steps, body horizontal, and neck outstretched. Evans (1899:266) thought that it "probably flies but little"; Finn (1908:158) describes the flight as light and butterfly-like. Goudot (1843b:4) says of the flight that it is not like that of herons, but more rapid and more prolonged.

Sun-bitterns are not gregarious, and according to Cabanis (1848: 752—British Guiana), they are found almost always singly, seldom in pairs. Carriker (1910:426—Costa Rica) states just the opposite, that they are almost always to be seen in pairs. The Penards (1908: 193—Dutch Guiana) reported finding them either alone or in pairs.

Delacour (1923:140—Venezuela) says that Sun-bitterns are shy but not wild and that "one can very well watch them without disturbing them." Carriker (1910:426) states that they "are not very shy, but with caution can be approached quite closely." The Penards (1908: 193) often found the birds standing in shallow water, frequently

dipping themselves; when approached too closely, the birds would fly a little distance away. They are easily tamed and apparently thrive in captivity (Knowlton, 1909:347); a Sun-bittern in the Sophia Zoological Garden lived for 17 years (Flower, 1938:221). Often these birds are kept as pets in houses and courtyards, where they consume numerous roaches, flies, and other insects (Taylor, 1864:95; Delacour, 1923: 140).

The few published accounts of food habits indicate that the Sun-bittern is strictly carnivorous. Insects are the most commonly reported item of diet (Knowlton, 1909:348); Newton (1899:925) mentions small fishes as well. Waterton (1891:321) says that the Sun-bittern does not live upon fish, that flies and insects are its food, and that the bird captures them as a heron captures fish. The Penards (1908:193) describe the method of feeding on insects as careful stalking in which the bird, with neck drawn in, approaches its prey until sufficiently close, when it suddenly thrusts its bill forward and captures the insect. From the stomachs of two freshly killed specimens, Deignan (1936:188) took shrimp, crabs, and other small crustacea; Goudot (1843b:4) also found small crustacea in the two stomachs that he examined.

Sun-bitterns have a peculiar but striking habit of spreading and elevating the tail and expanding the wings so that the tail and wings together form an almost complete circle about the bird (Newton, 1899: 925; Alexander, 1936:481, 482). This is part of a sort of dance, believed by Finn (1908:158) and Pycraft (1931:669) to be courtship display. Rusby (1933:175) observed this dance and gave a good description of it. He says that *Eurypyga* "inhabits the dense shrubbery, but seeks patches of bright sunshine to perform its acrobatic dances. The one I saw occupied a brilliant patch of sunshine some ten or twelve feet in diameter in the middle of the road. He ran rapidly around in a circle from right to left, with his right wing stretched upward, apparently as a restraint, enabling him to circle more rapidly and securely, and then reverse the movement. Then he leaped into the center of the space and hopped up and down, sometimes with both feet and then one at a time. He stretched his head upward as far as possible, and then suddenly brought it down close to the ground, at the same time arching his back. Besides these regular movements, he indulged in the most erratic series of leaps and capers imaginable. There was evidently no relation between these actions and any practical objective, such as securing food." Rusby attributed this dance, not to courtship, but to indulgence in pure delight.

The voice of the Sun-bittern has been described by Newton (1899: 925) as a "plaintive piping," and Finn (1908:158) states that it is a metallic whistle and, in alarm, a grating hiss. The Penards (1908:193) describe the call as *foe foe foe* or *so-le r r r*, often accompanied by a rattling of the bill. According to Bates (1863:82), although the bird

is difficult to see because of its somber plumage and dark habitat, its hiding place is often betrayed by its note—a soft, long-drawn whistle.

According to the Penards (1908:194), the nest of the Sun-bittern "is sometimes on the ground, but usually placed in trees, about two or three meters from the ground; it consists of a mass of mud and dry leaves with a semicircular entrance at the side" [translated from the Dutch]. Goudot (1843a:1) says the nest is placed in marshy areas, built of mud on low intertwined branches, about five or six feet (*pieds*) above the ground. Skutch (1947:38) observed a nest March 26, 1945, in Costa Rica, located in a stream-side tree, about 20 feet above the ground and about 10 yards back from the water's edge. It was a large, bulky, roughly globular structure, approximately 12 inches in diameter, precariously saddled on an apparently unbranched portion of an obliquely ascending limb about two inches in diameter. "It was composed of decaying leaves, stems, and other vegetation, a small amount of green moss, and apparently also some mud. In the top was a shallow depression lined with green leaves."

The most complete account of the nidification of Sun-bitterns is that by Bartlett (1866:76) concerning a pair in the Gardens of the Zoological Society of London. These birds had been in the Gardens for about three years. Early in the month of May 1865 "they began to show signs of breeding, by carrying bits of sticks, roots of grass, and other materials about; they were constantly walking round the pond, evidently in search of materials to compose a nest, and appeared to try and mix wet dirt with bits of moss, etc. This suggested the idea of supplying them with wet clay and mud, which they at once commenced to use. After a short time they settled to make a nest on the top of a pole or tree about 10 feet from the ground, on which was fixed an old straw nest. Both birds carried up mud and clay mixed with bits of straw, roots of grass, etc. The sides of the nest were raised, and thickly plastered inside with mud."

After completion of the nest, the female laid three eggs: The first, laid shortly after the nest was built, was found broken on the ground beneath the nest. Early in June a second egg was found in the nest. Of the incubation of this egg, Bartlett (p. 77) says, "The two birds were very attentive, and took turns at incubation, and in twenty-seven days the young bird was hatched (July 9th). On the following day I ventured to look at the young bird . . . . it is certainly one of the prettiest young birds I ever saw. It is thickly covered with fine short tufts of down, and much resembles the young of Plovers and Snipes, with this addition, that the head and body was thinly covered with rather longer hairs than are to be seen in the former-mentioned birds. [The pattern of the downy young, as shown in Bartlett's accompanying plate, is an intricate one of spots, stripes, and marbling.] The young bird remained in the nest and was fed regularly by both parents, the food consisting principally of small live fish, a few insects, etc. The

mode of taking its food was somewhat peculiar: it did not gape and call or utter any cry like most nestlings; but as soon as the old birds flew upon the nest with the food in their bills, the young one snapped or pecked it from them and swallowed it at once. The young bird remained in the nest twenty-one days, by which time its wings were sufficiently grown to enable it to fly to the ground. It was there fed as before, and never afterwards returned to the nest; it grew quickly, and at the end of two months was indistinguishable from the old birds. Early in August the old birds began to repair the nest, and added a fresh lining of mud and clay, and at the end of August laid a third egg. The male bird now appeared to attend to the duties of incubation with much greater care than his partner, who fed the now nearly full-grown young one; they, however, managed to hatch the second young bird on the 28th of September." Since the conditions in which these breeding activities took place were completely different from those of the Sun-bittern's natural haunts, it is not necessarily true that its activities in the wild would be the same.

As to the time of breeding: The Penards (1908:194) state that in Dutch Guiana, *E. helias* breeds during the season of the big rains (mid-May or June to July or August). Deignan (1936:188) took a pair of Sun-bitterns in Honduras on April 23, the male with "right testis greatly enlarged, the other only slightly so." The ovaries of the female were also greatly enlarged and contained a fully developed egg—lacking only the shell. Goudot (1843a:1) reported birds fairly well formed within the egg in August.

The Penards (1908:194), Stresemann (1934:770), and Goudot (1843a:1) report the number of eggs to be two, and there were two eggs in the nest discovered by Skutch (1947:38). Nehrkorn (1899: 206) described the *Eurypyga* eggs in his collection as having a reddish clay-colored background with large uniformly distributed violet-gray spots underneath and sparse rust-brown spots above ("underneath" and "above" referring, not to the position of the spots on the oval of the egg, but to the depth of the spots within the shell); the shells are described as delicate and moderately glazed; the measurements: 44–45 × 34–35 mm. This description is similar to that given by the Penards (1908:194). The egg figured by Goudot (1843b:pl.38) seems to correspond in size but does not otherwise fit this description very closely. The general background color of this egg is between Pale Pinkish Cinnamon and Pinkish Buff. Large irregular spots and blotches, between Light Purplish Gray and Pale Purplish Gray, occur irregularly upon the larger end, along with somewhat smaller spots of Olive-Brown and Dark Bone Brown.* Small spots of the last two colors are intermingled with the larger blotches and are scattered over the smaller end of the egg. The shape of the egg is nearly oval.

* Capitalized color names are taken from Ridgway, 1912, "Color Standards and Color Nomenclature."

That the young are downy when hatched has been pointed out above. Chubb (1916:143) says young Sun-bitterns "differ from most young birds by gaining the adult plumage direct from the nestling down without passing through an intermediate stage." Another unusual thing is that—though hatched with the down of precocial birds—they remain in the nest and are fed there by the parents. Bartlett (1866:77—see above) and also Salvin and Godman (1903:334) report that the young are fed by the parents for some weeks. Stresemann (1934:770), however, says the young leave the nest within a few (possibly two) days.

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LIFE HISTORY NOTES ON PUFF-BIRDS

BY ALEXANDER F. SKUTCH [1]

THE Bucconidae, or puff-birds, are a family of about 30 species of small or middle-sized arboreal birds confined to the tropical American mainland. Abundant loose plumage, relatively big heads, and short tails give many of the species a stout, "chunky" appearance. The puff-birds are rather somberly colored in shades of brown and deep grays, often conspicuously spotted and streaked, or with boldly contrasting areas of black and white. The bill is short or medium, often notably stout, terminally decurved or more or less strongly hooked. The feet are zygodactyl—with two toes directed backward. The family is best represented in the Amazon Valley and northern South America, and only three species occur in Central America, north of Panamá.

Despite infinite searching through the forests of Central America, I have found but two nests of puff-birds, one of the Black-breasted Puff-bird and one of the White-whiskered Soft-wing; both were destroyed before life history studies could be completed. But in view of the paucity of our information on the breeding habits of this family, it seems desirable to publish my notes (though more or less fragmentary) on these two nests. In an attempt to round out a picture of this interesting family, I present also brief notes on two puff-birds of South America: the Black-fronted Nun-bird and the Swallow-wing.

Black-breasted Puff-bird
Notharchus pectoralis (Gray)

The Black-breasted Puff-bird is of medium size—about eight inches in length. In both sexes the plumage is predominantly black, with conspicuous areas of white on the auricular regions, on the chin, throat, and hind neck, and on the abdomen. A black band across the breast extends upward between the white of the auricular regions and the throat. The black feathers of the head, upper back, and breast are glossy, with a bluish tinge; those of the lower back, rump, upper tail coverts, tail, and wings are duller, more slate-colored than black, many of them with narrow white margins at the tips. The eyes are dark, the bill heavy and black, the legs and feet dusky. The bird is well illustrated by F. L. Jaques (in Sturgis, 1928:pl. 14) and by Sclater (1882: pl. 24). It inhabits a restricted area of lowland forest extending from the Canal Zone to central Colombia.

I have found the Black-breasted Puff-bird only on Barro Colorado Island, Canal Zone, and even here I saw it only rarely except while I was watching at a nest. Apparently it remains most of the time well up in the trees, where it is seldom seen from the ground; the nesting pair that I watched, when approaching or leaving the nest, flew

[1] This paper was prepared for publication while the writer held a fellowship of the John Simon Guggenheim Memorial Foundation.

through or even above the treetops, but the woods of the nest area were low. Like other puff-birds, the Black-breasted Puff-bird sits for long periods on the same exposed bough, its feathers fluffed out, a picture of stupid lethargy. But although outwardly motionless, it is ever alert. Let any edible insect appear, whether flying in the air or crawling over leaf or bark, the "stupid" puff-bird darts swift and straight, seizes the insect in its strong bill, returns promptly to its perch, and pounds the victim loudly against the branch before gulping it down. Then the bird remains quietly perching until another morsel tempts it into action.

Voice. Even with its voice, the puff-bird appears never to expend its energy unnecessarily. The construction of the nest calls forth outbursts of song from many birds, especially from the related jacamars; but my pair of Black-breasted Puff-birds voiced only low, whispered *peep*'s while so engaged. This, and a nasal sound uttered when they were disturbed at the nest, were the only notes I heard from them during many hours of watching.

Nest-building. While wandering through an area of second-growth woodland on Barro Colorado Island on March 28, 1935, I heard a low tapping sound which led to the discovery of my first pair of Black-breasted Puff-birds. They were digging into the side of a very large black nest of termites (the species was determined by Dr. A. E. Emerson as *Nasutitermes pilifrons*), which was situated about 30 feet above the ground, far out on an ascending branch of a small tree that was leafless but apparently living. The tree grew beside a narrow open space amidst the woods, which facilitated subsequent observations. Since the morning was already far spent, I went away, after noting that the birds had made a very shallow depression in the side of the termitary. Evidently they were just beginning to excavate their nest-chamber.

When I returned next morning at a few minutes before eight o'clock, I failed to find the puff-birds in the vicinity; I wandered about but at 8:45 heard tapping and returned to the observation post that I had already chosen, a fallen log from which I had a good view of the termitary. I found the pair perching quietly on a slender, leafless branch in front of their hole in the side of the black mass. They appeared not to notice my approach, although I made no attempt to conceal myself. Soon one flew to the excavation and clung to its rim; it clutched the lower edge of the shallow depression in the side of the termites' nest, its short black tail propped against the outside of the nest, and its head bent forward into the hole, so that from my position on the

ground I could not see it. In this attitude it remained almost motionless, but at fairly long intervals took a few pecks at the termitary. Four taps were the most that I heard at a time; and each short spurt of activity was followed by a relatively long period of silence and immobility. I could not see the head of the bird, and it is possible that it was devouring the termites which came out to defend their nest. After clinging in this manner for about 15 minutes, the bird flew out and rejoined its mate on the leafless branch. A few minutes later the mate flew to the termitary and behaved as the first had done. It hammered audibly at the structure more frequently than the first, yet still very little. It remained only six minutes and, upon leaving, darted to the trunk of the tree, plucked an insect from the bark, and flew with it to a horizontal swinging vine not far distant. It knocked the insect against the vine, then swallowed it. Six minutes later the first bird returned to the termitary. So long as I watched them (8:45–10:12 a.m.), the two thus alternated, remaining from less than one minute to as much as 12 minutes clinging in front of their excavation. Sometimes they hammered more, sometimes less; but always their tapping came between long periods during which, so far as I could see or hear, they were inactive; and neither tapped more than four times together.

The member of the pair not at work usually sat motionless on the bare limb with feathers puffed out in characteristic fashion. At intervals it made a long dart to pick some insect from a distant branch or leaf. Both members of the pair were perfectly silent, except for a low, whispered *peep* that I heard at times. At 10:12 the bird which had been at the termitary flew out and away, and five minutes later the mate followed. What a contrast these stolid birds made with alert and lively jacamars, timid trogons, noisy kingfishers, hard-working woodpeckers, and all other birds I have watched dig their nest-chambers in earth or wood or termites' houses!

By April 3 the hole in the side of the termitary had become so deep that when the puff-birds were at work in it the tip of the tail just reached the rough black outer surface of the structure. They devoted long hours to their task, and I found them at the termitary both morning and afternoon. They flew away just as I approached at about 8 a.m. on April 3, but their departure was evidently spontaneous, since they seemed completely indifferent to my presence. In 15 minutes one of the pair returned and went promptly to work, while a moment later the second arrived on the perch where they always awaited turns at the task. They alternated at the work as before, but one spent considerably more time in the termitary than the other. Between 8:15 and 9:53 this bird gave 57 minutes to the task, while the mate, which I could distinguish by a disarranged tail feather, remained at work a total of only 30 minutes. The greater time given by the first was accounted for

by two long shifts of 16 and 17 minutes, respectively. The other periods of work of this bird were of 5 to 7 minutes' duration, and those of the mate lasted from 2 to 6 minutes.

While at work, they frequently uttered the low, soft peeping, which was the only vocal sound that I had so far heard from them. The bird waiting outside sometimes darted after insects, often to a considerable distance; but there was no courtship feeding. During the longer shifts, the puff-bird sometimes emerged from the cavity and rested for a short time while it clung to the lower edge of the hole. Perhaps when I first watched I had underestimated the amount of work that they actually performed while inside the cavity. With my ear pressed against the trunk of the supporting tree, I could hear sounds from within the termitary which were otherwise inaudible to me. The tapping was far more frequent than I had supposed from the louder taps which alone had reached me where I had been sitting. There were also sounds which seemed to indicate that the puff-birds crunched or tore at the substance of the termitary, in addition to pecking at it.

Returning between four and five o'clock that afternoon, I found the puff-birds at work. They stayed in the termitary for briefer periods than in the morning, and changed about more frequently. In the morning I had been obliged to watch the birds against the sun, but now I had the sun behind me and received a far more striking impression of their contrasting white and glossy bluish-black plumage.

The puff-birds were still working at their hole in the termitary in the middle of the afternoon of April 10, at least 14 days after they had begun it. On April 13, I managed to reach the nest. I nailed cleats to the trunk to facilitate frequent visits; and since the branch that supported the termitary seemed too slender to bear my own weight in addition, I braced it with a rope tied to the central trunk. Even after I had climbed to the termitary I could not see into the puff-birds' nest, whose entrance opened on the outer side, away from the trunk. To overcome this difficulty, I laid a stout pole between the nest-tree and the crotch of a neighboring tree. Then, standing upon the horizontal beam and steadying myself with one hand upon the branch that supported the termitary, I could at length look into the opening. The next day I noticed that the termites were eating away the supporting rope and the lashings, and I replaced all the cordage with wire for greater safety.

When examined on April 13, the puff-birds' nest-cavity seemed to be completed. A narrow, horizontal tunnel, about 7 inches in length by 1⅞ inches in diameter, led into the top of a spacious, neatly rounded chamber in the heart of the termitary. To see anything in the dark interior it was necessary to use artificial illumination, in the form of a small electric bulb attached to the end of wires leading to an electric

torch that was hung close by. A small mirror, pivoted transversely on the end of a long handle, revealed portions of the chamber that could not be viewed directly.

When I began to nail the cleats to the trunk of the tree, the puff-birds, which were resting on their favorite perch in front of their nest, remained where they were until the vibration as I advanced higher drove them away. During the next 10 days I visited the nest on alternate days. I usually found one of the pair of puff-birds standing guard on the perch in front of the entrance. Despite the shaking of the slender branch as I climbed toward the bird, it stayed quietly where it was until I came within two or three yards of it, when it flew silently away. Twice I chanced to find a bird in the nest, where it remained, considerably shaken by the swaying of the termitary caused by my movements, until I had seated myself on the cross-piece in front of the nest and begun to arrange the lighting apparatus, when it flew out past my ears, uttering a nasal sound.

The eggs. On April 23 I was delighted to find that the first egg had been laid. It was placed so near the back of the chamber that when I put in the light I could see it without the mirror. The egg seemed small in proportion to the puff-bird. It was pure white, with a beautiful glossy shell, and resembled the egg of a woodpecker. It reposed on some chips of the hard black substance of the termitary, which had not been removed; no material of any kind had been brought into the chamber to line the nest. On April 24 I found the second egg; and the third and last was laid on April 26, indicating that the eggs were deposited at two-day intervals. During the period of egg-laying one bird stood guard in front of the nest, as during the 10-day interval between the completion of the nest and the deposition of the first egg. I made all my visits during the afternoon, in order to be less likely to disturb the female while she was laying.

Incubation. On the morning of May 3 I took up a position in view of the nest at 5:45, just as the darkly overcast sky was beginning to brighten from black to gray. At 6:16 the puff-bird which had passed the night on the eggs appeared in the doorway of the nest. The pure white throat was the only part of the bird which was plainly visible as it paused in the entranceway to look out upon the forest dripping after the night's hard showers and still dim beneath a dense mantle of clouds. After a minute's delay, the bird launched forth and flew with short, swift wing-strokes over the treetops and beyond my range of vision. At 6:33 a member of the pair arrived and, after a brief survey of the immediate surroundings, entered the nest. It was impossible to tell whether this was the bird which had left 17 minutes earlier or (which

is more probable) the mate. This bird sat in the nest for nearly three hours while I watched, drenched by the heavy showers that had meanwhile begun to come down. At 9:15 it came to the doorway, looked about with its head framed in the round aperture, then flew forth. It paused for many minutes among the branches near the nest, then flew out of sight over the low trees. Since, without seeing one bird relieve the other, I could not make certain whether one or both incubated, I decided to leave. Just as I was passing beneath the nest, at about 9:30, a puff-bird arrived to enter it. I stood still to watch, but I was too near, and after a little hesitation the bird flew away again.

Arriving at the nest at 1:57 p.m. on May 5, I found a puff-bird perching quietly in front of it. Here it remained for half an hour, sometimes stretching its wings, and once catching a big flying insect, but mostly it sat motionless. The record of the following hour and a half is given below:

2:30 The puff-bird entered the nest.
3:03 It left, paused a few minutes on the perch in front of the nest, then joined its mate in the next tree.
3:25 After pausing for some time in the vicinity of the nest and catching two insects, a bird entered.
3:32 It left and rested in front of the nest.
3:50 It entered again.
4:01 It left and perched in front of the nest.

This was most erratic behavior on the part of birds that had been incubating their eggs for nine days and that were capable of sitting nearly three hours at a stretch. I decided to look into the nest and see whether anything was amiss. The puff-bird that had just left the nest remained perched in front of it while I climbed the tree. When I was only about six feet away, it flew to a more distant perch in the next tree, and sat, silent and stolid, only turning its head from side to side as it watched me, during the entire time I was at the nest.

The electric light revealed the eggs safe and sound in their usual position. A few small black ants were crawling around the interior of the chamber, and in and out through the entrance tunnel, but they had been present since before the eggs were laid and were, moreover, perfectly innocuous. I could see no cause at all for the puff-birds' uneasiness.

Upon reaching the nest on the afternoon of May 6, I found one of the pair perching quietly on the pole that I had fixed transversely in front of the termitary. The bird retained its position despite shaking until I came within six feet. At this distance I paused to look at the chubby little creature, so oddly marked with black and white, and

to gaze into its large, alert dark eyes. Only when I began to move closer did it take wing and dart over to a perch in the next tree, about 12 or 15 feet away, where it remained to watch my proceedings. The eggs were not in their usual position, where I could see them the moment I switched on the light. I stuck in the mirror, and turning it and the electric bulb from side to side, explored all the darker portions of the chamber to learn whether the eggs had been displaced there. But the result of all my searching was negative. I spent about half an hour at the nest; and all this time the puff-bird that was present when I arrived lingered in the same spot, intently and silently watching me, turning its big head at intervals from side to side. Before I descended, the mate arrived and perched near the first bird.

I had hardly reached the ground when one of the puff-birds flew to the perch in front of the nest, where it was soon joined by the mate. Then the first bird flew to the entrance of the nest and clung there, apparently wanting to enter, yet fearing to do so. It pushed its head in a little way, then backed out, then pushed in again, a little farther. It was plainly torn between two conflicting impulses. At length, without having penetrated to the nest-chamber, the bird retreated and joined its mate on the perch. The latter then went to the entrance, repeated the same performance, and came back without having entered. Then the first flew again to the doorway, but was no more courageous this time than last, and rejoined its mate on the branch in front of the nest. Finally the second puff-bird went the second time to the entrance and, slowly and cautiously, sometimes advancing, sometimes retreating, arrived at last at the chamber. While these explorations were in progress, the two birds uttered occasional monosyllabic *peep*'s, somewhat louder than I had heard them voice before, but still not loud.

After a minute the puff-bird came out head first, proving that it had gone all the way into the chamber, where alone there was room to turn around. It joined the mate on the perch, and after four minutes the other went inside, though not without considerable hesitation. This was its third attempt to enter. It remained within for two minutes, then emerged head first, as the other had done. Then the second, which meanwhile had withdrawn to a more distant perch, flew again to the entrance, uttering a peculiar, low, nasal sound as it went past its mate, which had remained on the branch in front of the nest. It went inside, came out after a minute, then after a pause went in once again, making three times in all. After its third exit it flew off to a more distant perch. The first puff-bird went yet again to the entrance, where it clung and called with weak *peep*'s, then flew off to join the mate, without having entered the nest. The birds devoted 40 minutes to their apparent hunt for the vanished eggs, before at last they flew off over the treetops.

And what could have taken the eggs? No hawk nor owl nor toucan could have entered the chamber, nor reached the eggs through the long, narrow entranceway. Any mammal slender enough to creep in would have been too small to remove the eggs in its mouth, and must have devoured them where they lay, leaving tell-tale particles of shell. But a snake could easily have slipped in and engulfed them whole, leaving no trace of its visit.

Bitterly disappointed by the loss of the puff-birds' eggs on May 6, I did not revisit their nest until May 30, when other business took me into that part of the forest. To my great surprise, the nest was occupied again. Despite the rather violent shaking caused by my climb up the slender supporting branch, the puff-bird that was sitting in the chamber did not dart out until I actually reached the termitary. Pushing in the electric light, I saw three eggs resting where the first three had lain. Instead of being immaculate white, as the first set had been when newly laid, these had become soiled and were covered with blackish speckles. Apparently they had been deposited a number of days earlier. Trogons' eggs laid in termitaries also become heavily soiled.

I had only two days more to remain on Barro Colorado, and in a last-minute effort to answer the question whether one or both members of the pair incubated, I watched again late on the afternoon of May 31. This time I was successful in witnessing the replacement of one by the other. One puff-bird was within when I began my vigil at 3:40 p.m. I observed no sign of activity at the termitary until 4:23, when the mate came flying through the treetops and settled on a high bough about 20 feet from the termitary. I was more than 40 feet away and heard no sound, but the puff-bird in the nest evidently did, for it came to the doorway. Here it paused a minute or two, looking out, then flew forth and alighted on a twig in front of the nest, where it delayed for several minutes, puffing out its feathers and uttering low *peep*'s. Next it went to a more distant perch and delayed longer, before at last it winged away over the treetops. The new arrival lingered where it had first come to rest, then flew to the perch in front of the nest and delayed still more, knocking the sides of its bill alternately against the branch. Finally, 23 minutes after its arrival, it entered the nest to stay—and at last I knew that the two sexes of the Black-breasted Puff-bird share the incubation of the eggs. It sat in the nest for 78 minutes (until 6:04), when it came out and lingered for 19 minutes on the perch in front, then flew away through the treetops. At 6:50 this bird or, more probably, its mate came out of the forest and after hesitating a minute or two entered the termitary, when the fading light had become so dim that I could hardly distinguish it. This was my last glimpse of a Black-breasted Puff-bird.

I had watched this nest for a total of 7 hours while incubation was going on. The 5 sessions on the eggs which I timed ranged from 7 to 162 minutes and averaged 58.2 minutes. Five periods when the eggs were unattended ranged from 17 to 46 minutes and averaged 25.2 minutes. The nest was occupied by one member of the pair or the other for only 70 per cent of the 7 hours. In their manner of incubation these puff-birds much resembled such toucans as the Blue-throated Toucanet (*Aulacorhynchus caeruleogularis*) and Frantzius' Araçari (*Pteroglossus frantzii*). The toucans, like the puff-birds, take sessions of very irregular length, now fairly long, now very short, and often go off before the mate arrives to replace them, leaving the nest unattended, so that one must watch long and patiently to assure himself that both members of a pair share the task of incubation. One of my Black-breasted Puff-birds sat once for a period much longer than I timed at nests of either of these far bigger toucans, and the sessions of the pair also averaged longer. Jacamars keep their eggs far more constantly covered.

The Black-breasted Puff-bird's habit of nesting in a termitary is not unique in the family. Cherrie (1916:321) found a nest of the Two-banded Puff-bird (*Hypnelus bicinctus*) in a termitary at Caicara on the Orinoco. An entrance tunnel about 8 centimeters in diameter led to a spherical chamber about 15 centimeters in diameter, hollowed out of the heart of the termitary. He records that one of the parents remained in the cavity, covering the single fresh white egg, while he cut and hacked at the hard, tough structure and the insects swarmed out everywhere over the nest in countless numbers. There was no lining in the chamber; the egg was deposited on the debris at the bottom of the nest-cavity. Because I did not cut into the termitary that contained the Black-breasted Puff-birds' nest, I saw practically nothing of the insects; they had sealed off the innumerable passages leading into the part of their dwelling occupied by the birds. The same thing occurs when trogons carve their nest-cavity in a termitary.

White-whiskered Soft-wing
Malacoptila panamensis Lafresnaye

The Soft-wing is a stout bird about seven inches in length. Its soft, loose plumage is colored with many blended shades of brown, chestnut, tawny, and buff which in aggregate give the bird at a distance a bright reddish-brown hue. From close by it is seen to be profusely spotted and streaked with tawny and pale buff on the upper plumage, and, on the under parts, broadly streaked with brown and dusky. *M. p. panamensis* is more liberally streaked than the northern

race, *inornata*. At the base of the bill are mustache-like tufts of white or whitish feathers, for which Sclater (1882:119, and pl. 40) called the bird the "White-whiskered Soft-wing" (the substantive a loose translation of the generic name)—a most appropriate English appellation which has been strangely ignored by later authors. The bird's eye is large and red; its bill rather long, stout, slightly curved, and dark above; its legs and feet yellowish gray. The coloration of the female is much less bright than that of the male, but in the dim light of the woodland it is not easy to distinguish the two.

The species, as a whole, ranges from western Ecuador to southern Mexico. On the Pacific slope of southern Costa Rica I have met the bird as high as 4,700 feet above sea-level, but it is much more abundant below 3,000 feet, and in general throughout its Central American range is known only from the Tropical Zone. A species of the rain forest, northward of Costa Rica it is largely if not wholly confined to the Caribbean side. In the forest the Soft-wings are usually seen within 15 or 20 feet of the ground; but I suspect that they spend a good part of their time at considerably greater heights, although because of their habitual immobility they are not often discovered among the taller trees until one becomes familiar with their voice. Not infrequently they wander from the primary forest into neighboring areas of older second growth, and occasionally I see them in the shady pasture in front of my house, hard by the forest. Like other forest birds, they seem often to come to the edge of an adjacent clearing in the twilight, apparently to enjoy a slightly longer period of daylight and to hunt food at a time when the illumination beneath the tall trees is too dim for this activity. Usually I have found Soft-wings singly, but not infrequently one individual will attach itself to a mixed flock of small birds of other species.

My notebooks contain no better word-picture of the Soft-wing's behavior than that which I wrote many years ago after my first meeting with the species. On the afternoon of September 4, 1930, John T. Emlen and I were following a trail through tall second-growth woods, in the Lancetilla Valley near the Caribbean coast of Honduras, when we met a Northern White-whiskered Soft-wing (*inornata*) resting upon a small bough 10 feet above the path. It permitted a close approach and sat motionless, very upright, while we examined the details of its plumage through our field-glasses (although most were clearly visible to the naked eye) and described them minutely to each other in voices perfectly audible to it. It was quite silent during the quarter of an hour or more that we had it in view, and while perching was motionless except that several times it rapidly about-faced on the branch, thus alternately exposing its front and back to our close scrutiny. While it appeared dull and stupid, it was by no means asleep, for its

eyes were ever watchful for creatures crawling over the surrounding foliage. When it espied its prey, usually below the level of its perch and at a distance of 10 or 15 feet, it darted out rapidly, and we distinctly heard the loud *clack* of its heavy bill as it closed upon the booty. Then it returned to a perch, usually the same, to sit quietly until some other suitable morsel presented itself. Once it shot straight toward us and picked up some insect in the grass beside the trail, not 10 feet from where we stood. In its habit of sitting motionless, scanning the foliage for insects, its rapid darts upon the prey and return to the same perch, and its habitual silence, it greatly resembled the Turquoise-browed Motmot (*Eumomota superciliosa*) of the same region, but permitted an even closer approach than the latter. After we had proceeded on our way and crossed the river we saw another Soft-wing, or perhaps the same again, perched low above the trail; and in the dim light of evening, I almost bumped into it before it took flight.

Because of its habitual fearlessness of man, and its habit of remaining motionless like a heron or kingfisher while keeping a sharp lookout for its prey, this puff-bird and many others of its family are frequently called "stupid," especially by collectors.

Voice. The Soft-wing is no more gifted in voice than the other puff-birds I know. The only notes that I have ever heard from it are thin, weak whistles or *peep*'s, but these vary considerably in length and intonation. While I sat in a blind amidst the forest on Barro Colorado Island in the Panamá Canal Zone, watching a nest of an antwren, a Soft-wing perched motionless for more than a quarter of an hour on the low twig of a sapling about 20 feet away, and repeated low, peeping notes which even at this distance were scarcely audible. At other times I have heard the bird utter a high, thin, sibilant whistle. One afternoon in May, in the forest in the basin of El General, Costa Rica, I watched a Soft-wing as it perched on a lower bough of a tall tree and delivered repeatedly a long-drawn, thin, sharp, high-pitched *tzeeee tzeeee.* As he voiced these notes, he twitched his tail far to one side, then far to the other, holding it motionless for a few moments at the extremity of each beat. I have often heard notes of this character floating down from somewhere above me in the heavy forest, but usually without being able to pick out their author with my eyes.

Nesting. On June 8, 1943, I found in the forest close by my house in El General the only nest of the White-whiskered Soft-wing that I have ever seen. It was in a burrow on a hillside which, although steep, was by no means precipitous—a horse could have climbed straight up. The forest was high, with a lofty closed canopy, and the undergrowth of bushes and saplings open and easy to walk through.

The ground, carpeted with fallen leaves and other litter, bore only a sparse, scattered cover of low ferns and saplings. The burrow descended obliquely at an angle of about 30 degrees with the horizontal. It was about 2¼ inches in diameter, perfectly straight, with a roomy chamber at its lower end. The total length from the entrance to the back of the burrow was 20½ inches. The chamber was lined on bottom and sides with large pieces of dead leaves, upon which rested two pure white eggs. The mouth of the tunnel was surrounded by a low pile of decaying twigs, some thorny, and dead leaves. On top of these were three big whole leaves, the largest 12 inches long by 4 inches wide. The edges of these leaves just touched the mouth of the tunnel. Although I thought the burrow had been dug by the birds, there was no fresh earth visible below it. Possibly when excavating, the Soft-wings carried the loose earth away in their bills, as chickadees and barbets remove the chips when carving their nest-cavity in wood; but if they actually did this, the excavation of the burrow must have been a long and laborious task. The nest was so well hidden, its mouth closely surrounded by dead leaves in the midst of the long, leaf-strewn slope, that I might have passed over it without becoming aware of its existence if a bird had not flown out as I walked by.

The two immaculate white eggs formed the complete set, for on subsequent days the number did not increase. I wanted to study the pattern of incubation at this nest, but because of the steepness of the slope and the positions of the neighboring trunks, the only point which offered accommodation for a blind was close in front of the burrow. I feared that alterations in the surroundings so near the nest might reduce its chances of escaping predatory animals.

On my subsequent visits to the nest, I almost always found a puffbird in charge. As I came near, it would emerge, fly to a bough above my head and repeat over and over its high, thin, long-drawn whistle. Then it would rise into the crowns of the trees and vanish. Or sometimes it would, upon leaving the burrow, fly without stopping into the upper levels of the forest, whence the whistles floated down from the unseen bird. But if I approached very softly and cautiously, I might throw in the beam of my electric torch and surprise the Soft-wing in the nest. It would always be facing outward as it sat on the eggs, and the large, deep red eyes shone brightly in the beam of light. As soon as I extinguished the light and stood to one side of the doorway, it would emerge and fly swiftly out of sight. Sometimes, upon looking into the tunnel after the bird's departure, I would see a number of dark-colored flies, as big as house flies, resting upon the white eggs.

When I approached the nest at 10 o'clock on the morning of June 17, both parents repeated their thin whistles almost continuously, but they were well up among the trees where I could not see them. Looking into the burrow with the electric torch, I saw that the eggs had

hatched. The nestlings were pink-skinned, completely naked, and had tightly closed eyes. Their short, sharp bills curved downward at the tip; the lower mandible did not exceed the upper in length, as with newly hatched woodpeckers, kingfishers, and jacamars. I could not see the nestlings' feet and did not wish to open the burrow and remove the birds for a closer examination, knowing that such interference would diminish their slender chances of living to fly from the nest. The young Soft-wings moved around rather actively upon their leafy bed, apparently trying to escape the light.

Two days later the nestlings had vanished, although the burrow and its surroundings were unaltered. I believe that only a snake could have entered to swallow the nestlings. I heard the parents whistling in the vicinity but could not see them; and if later they made another nest in that part of the forest, it escaped my search.

I have not seen any published description of the nest of the White-whiskered Soft-wing (*Malacoptila panamensis*), but Arbib and Loetscher (1935:327) report having found it breeding in the Panama Canal Zone during July and August. Todd and Carriker (1922:227) describe briefly a nest of the closely related Mustached Soft-wing (*M. mystacalis*) discovered in the Santa Marta region of Colombia: "The nest is placed at the extremity of a hole in a bank of earth, excavated by the birds to a depth of nearly two feet (in the case of the one examined). The tunnel proper is from two to three inches in diameter, while the nest-chamber at the end is enlarged to be about six inches across and four inches high. The nest is very slight—merely a few twigs and dead leaves. The one examined was in a bank by the roadside, where people and animals were passing daily; it contained one young bird, nearly fully fledged."

Black-fronted Nun-bird

Monasa nigrifrons (Spix)

The most memorable event of my visit on October 6, 1940, to the Río Yavarí, a southern tributary of the Amazon which forms part of the boundary between Perú and Brasil, was a meeting with a flock of Nun-birds. While we examined a rubber tree in a riverside plantation, a small flock of these birds perched in the boughs close above us. They were very tame and allowed us to see them well. They were dark on all the upper parts, wings, and tail, and their under plumage was dark gray. Their only bright color was on the strongly tapering bill, which was brilliant orange. Cherrie (1916:322) states that in Venezuela a related species (*M. niger*) has a poppy-red bill and is called *pico de lacre* (sealingwax-bill), a name which would equally well fit the Peruvian bird. Their eyes were large and dark, their feet blackish. While perching quietly above us they voiced soft musical murmurs, the while twitching their black tails from side to side.

The Nun-birds appear to be more sociable than the majority of the puff-birds, and a careful study of their habits might reveal some interesting relationships. But we are fortunate in having a description of a nest of the Black Nun-bird (*Monasa niger*) found by Cherrie (1916:322) in the Orinoco region of Venezuela on May 27, 1907. This was in a burrow situated in a belt of heavy timber bordering the San Feliz River. The tunnel was about 7.6 centimeters in diameter and 1.5 meters in length, and went down into the level ground at an angle of about 45 degrees with the surface. Covering the entrance was a pile of coarse and rotten dead twigs, as large as a half-bushel measure, and "unquestionably of recent construction." The mouth of the burrow itself was reached through a rounded tunnel which ran along the ground beneath the pile of sticks. So cleverly concealed a nest would not have been discovered had not the cries of the well-grown young, issuing from beneath the brush pile, drawn Cherrie's attention. In the presence of a pile of dead vegetation over the entranceway, the burrow of the Nun-bird resembles that of the Soft-wing, but in the Nun-bird this feature was far more strongly developed; the Nun-bird likewise left no loose earth about the entrance.

Swallow-wing

Chelidoptera tenebrosa (Pallas)

While voyaging with a rubber survey party over the waterways of eastern Perú in the gun-boat *Amazonas,* I saw much of the Swallow-wings along the shores of the Amazon, the Marañon, and their great tributaries, the Huallaga, Ucayali, and Napo. Swallow-wings are about the size of a large swallow, but stouter of body and with a bigger head. In plumage they are chiefly black, but with the rump pure white, the abdomen rufous, and the under tail coverts dull white. The pointed tips of the long wings, when folded, reach almost to the end of the short tail. The bill, fairly stout at the base but tapering to a sharp tip, is black and markedly curved. The feet are blackish and the eyes dark.

These birds rested, generally in pairs, on the topmost leafless twigs of tall, dead or dying trees along the shores, whence they made long aërial sallies in pursuit of insects, returning usually to the same high lookout to devour their victims and await another capture. It did not occur to me that these "flycatchers" might be puff-birds until months afterward, when I found them depicted among other members of this family in Goeldi's "Album de Aves Amazonicas." But when one gives thought to the matter, it is clear that the Swallow-wing has only developed to a higher degree the insect-catching arts of its relatives *Notharchus* and *Malacoptila*; it pursues the insects above the trees rather than among them, with a corresponding increase in

radius of action and ease of flight. The only note I heard from these Peruvian Swallow-wings was a weak whistle. From the Amazonian plain I traced them upward into the Andean foothills; the highest seen was near San Ramón Chanchamayo, at about 2,700 feet above sea-level.

Like the Soft-wings and Nun-birds, the Swallow-wings nest in burrows in the ground. According to Cherrie (1916:323), who found the species not uncommon along the Orinoco, frequenting open glades in forested regions or the light woodland bordering savannas, they may dig their tunnels either in the bank of a stream, like a Bank Swallow, or in level ground. The straight shaft slants downward at an angle of about 30 degrees with the horizontal and varies from about one to two meters in length. At the nether end is a slight enlargement where the eggs, pure white and generally two in a set, rest upon the bare ground or on a few bits of dead grass. The birds apparently carry off in their bills all the earth they excavate, for no loose dirt was found about the mouth of the tunnel. No mention is made by Cherrie of a pile of leaves or sticks over or around the orifice of the burrow, as with those of *Monasa* and *Malacoptila*. The young Swallow-wings are hatched perfectly naked, like the nestling Soft-wings, but their skin is slate black instead of pink. When they are about half grown and their pin feathers begin to appear they are said to creep out to the entrance of the burrow, where they sprawl in the sun while awaiting the visits of their parents with food. If suddenly alarmed, they scuttle backward into their burrow, never pausing even long enough to turn around. The bottom of nests containing older young swarm with maggots that thrive in the excrement and cast-off parts of the insect food—chiefly small beetles—with which the young are nourished. Cherrie records that he found four nests between March 2 and May 8.

Summary

The Black-breasted Puff-bird (*Notharchus pectoralis*) lives among the crowns of the trees in the lowland forests of eastern Panamá and northern Colombia. It perches motionless much of the time, breaking its long periods of immobility by sudden darts to snatch insects from the vegetation or from the air.

The only notes heard were a low, weak *peep* and a nasal sound uttered when the birds were disturbed at their nest.

On Barro Colorado Island a pair were discovered carving a nest-chamber into a big, black, arboreal termitary on March 28, 1935. The sexes alternated at this task, and they worked hard through much of the day over a period of two weeks before the nest was completed.

During the 10 days which elapsed between the apparent completion of the chamber and the laying of the first egg, one or the other member of the pair guarded the nest much of the time. It rested quietly in front or at times sat within.

Three pure white eggs were laid at two-day intervals.

Male and female took turns at incubation, but usually one flew away before the other arrived to replace it. Their periods of sitting were most variable, those timed ranging from 7 to 162 minutes. During 7 hours of observation the eggs were covered only 70 per cent of the time.

The eggs vanished before hatching, apparently taken by a snake. The parents made repeated inspections of the nest after their disappearance.

After a few weeks a second set of three eggs was found in the same cavity.

The White-whiskered Soft-wing (*Malacoptila panamensis*) dwells chiefly in lowland forest, but at times is seen in adjoining areas of older second growth and even in shady pastures. In its manner of catching insects it greatly resembles the Black-breasted Puff-bird.

Its notes are weak *peep*'s or high, thin whistles.

A nest was found, on June 8, 1943, in a short burrow going obliquely down into a steep hillside covered by tall forest. The chamber at the lower end was lined with dead leaves, and a little heap of twigs and dead leaves surrounded and concealed the entrance. Although the burrow was apparently dug by the puff-birds, no excavated earth was found near it.

Two white eggs formed the full set.

The nestlings hatched quite naked. They vanished, apparently taken by a snake, when two days old.

The Nun-birds (*Monasa*) appear to be more gregarious than other puff-birds. Their nests in burrows (as described by Cherrie) have points in common with those of the Soft-wing.

The Swallow-wings (*Chelidoptera tenebrosa*) rest in pairs on the exposed tops of tall trees, whence they dart out or up in spectacular fashion to catch flying insects. Their notes are soft whistles. They nest in burrows in the ground, and the young are born naked.

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FINCA 'LOS CUSINGOS,' SAN ISIDRO DEL GENERAL, COSTA RICA

A SINGING FEMALE WOOD THRUSH

BY HERVEY BRACKBILL

THE female Wood Thrush (*Hylocichla mustelina*) of a color banded pair whose two nestings I studied in Baltimore in 1943 sang frequently during the laying and incubating stages of both nestings. Her utterances differed in form from the songs of males and were weaker and less musical, but their sustained and vibrant quality marked them definitely as songs. (This female did not return in 1944.)

I have mentioned (1943:82) another female Wood Thrush that, during a defense of territory, voiced at intervals a short, explosive cry that had a musical quality and suggested rudimentary song; other observers have reported song by females of two other hylocichlids, Bicknell's Thrush (*H. minima bicknelli*) and the Veery (*H. fuscescens*). Wallace (1939:314) states that practically every sitting Bicknell's Thrush that he watched sang occasionally during incubation, hatching, and brooding. The dates given by Halle (1943a:103, 1943b:46–47) for the singing of a Veery that seemed to be a female suggest a song cycle extending from courtship three-fourths of the way through incubation.

The songs. The songs of the female Wood Thrush were of two distinct forms. The one I heard oftenest I recorded as ***huh-huh-huh-cheee.*** The ***huh*** notes were much like the common soft call of the Wood Thrush, but "heavier" or "solider"; although usually three or four in number, they varied from one to six. ***Cheee,*** the accented note of the phrase, was a somewhat prolonged, definitely vibrant note, resembling the final note of a male Wood Thrush's rising song phrase but hoarse and much below a male's in volume.

The second song form was ***huh-huh-huh huh-o-wee,*** the introductory ***huh***'s as in the first song, but the ***huh-o-wee*** a slurred, flat-toned whistle, with the accent on ***wee.***

There were some variants of both main forms, and also occasional songs that combined the characteristic sections of both, as: ***hoo-yuh-wee cheee*** (the first phrase a flat-toned whistle, accented on the ***hoo***), and ***huh-huh-huh-huh hoo-wee cheee*** (accent on the ***wee***).

Song cycles. The mate of the singing female, a color-banded bird from 1942, returned to his nesting territory on May 8, 1943; the female was present by May 9; nest building occurred May 10 to 13, laying May 14 to 17, hatching May 28 to 30, and the young left the nest (prematurely) June 7. Building of the second nest began June 11, laying occurred June 16 to 18, hatching June 28 to 30, and the young left the nest between July 10 and 12.

The female's song was cyclical. Each cycle began, as far as I observed, early on the morning of the second laying day. The first cycle was at least 16 days, May 15 through May 30, song last being heard

some hours after the hatching of the fourth and last egg. The second cycle was at least 5 days, June 17 through June 21, song last being heard on the third day following completion of the clutch of three eggs. (On five occasions on four later days during incubation and hatching, I watched this nest for one to four hours at a stretch without hearing the female sing.) This decline in the female's singing from brood to brood resembles the decline in attentiveness that in a previous study (1943:86) I recorded for both members of a pair of Wood Thrushes. Nice (1943:127) found that female Song Sparrows (*Melospiza melodia*) sang only before the first nesting.

Place of song. On the first day of each song cycle the female sang both from the nest rim and from perches out in the territory. On the second day of the first cycle I once saw her sing in the home tree a few yards from the nest. With these exceptions, I saw her sing only when she was sitting on the nest (however, once steady incubation had begun I never followed her on her foraging trips between sittings).

The greatest distance from the nest at which I observed singing was 43 yards, on May 15. Other song perches that day were 30, 27, and 23 yards from the nest. On June 17 some singing was done 21 yards and 4 yards from the second nest.

Except for one that was only 3 feet up, the perches used were 10 to 18 feet above the ground. The first nest was 17 feet and the second nest 11 feet above the ground.

Wallace (1939:314–315) actually observed female Bicknell's Thrushes singing only from the nest. I infer from Halle's accounts (1943a:103, 1943b:46) that the female (?) Veery sang when away from the nest.

Hours of song. The female Wood Thrush sang at all hours of the day. The distribution of my records parallels to some degree my opportunities for observation; most records during both nestings fell between 5:00 and 7:00 a. m.; during the first nesting there were a number between 5:45 and 6:45 p.m. and a scattering between 10:00 and 11:30 a.m.; during the second nesting there was one at 2:45 p.m.

Wallace (1939) mentions that one female Bicknell's Thrush sang "at various intervals during the day" (p. 341) and that two sang in the late evening (p. 338).

Rate. The highest rates of song observed were: May 15, 5 songs given in 30 seconds; May 19, 7 given in each of 2 (non-consecutive) minutes, 4 in one minute; June 19, 3 in each of 2 (non-consecutive) minutes.

For periods of continuous singing the highest rates were: May 15, 23 songs in 9 minutes (from the nest rim), 19 songs in 8 minutes (away from the nest); May 19, 59 songs in 27 minutes (on the nest); June 19, 29 songs in 45 minutes (on the nest).

Volume. The songs varied considerably in volume. At their weakest they almost justified "whisper" designation; at their loudest they were still far below male song. I did not determine their carrying power exactly, but on May 19 I heard song from a distance of 16 yards and on June 21 from 23 yards; these songs would have been easily audible at considerably greater distances—possibly 35 yards. The songs were loudest at the start of each cycle.

Attitude when singing. I never saw the female Wood Thrush adopt an unusual attitude when singing; she perched or sat in her customary ways; sometimes there was not even a perceptible bill or throat movement.

Song stimulus. During the two nestings I observed the female's starting to sing 26 times. The apparent stimuli were: the male's song, 14 times (12 times in first nesting); the male's calls, once (second nesting); the singing male's nearer approach, once (first nesting); the male's silent approach to a distance of about 25 yards, once (second nesting); a neighboring male's song 80 yards or more away, once (first nesting); the cries of a full-grown young Robin (*Turdus migratorius*) being banded 23 yards away, once (second nesting); no observed stimulus, 7 times (4 times in first nesting).

On the occasion when the singing male's nearer approach appeared to be the stimulus, the nearer perch from which he sang was one of his most-used ones. Every time during the first nesting that his song seemed to stimulate the sitting female to sing, he sang from about that same place (he was not always visible to me). I do not believe he was ever visible there to the female, but I cannot be sure.

The interval between the male Wood Thrush's starting to sing and the female's response (when she did respond) varied from "at once" to 7 minutes. The female's reaction was quickest at the height of her song cycles. Thus, of 8 song bursts evoked by the male's singing May 15-19, 4 came "at once" and the others after 30, 60, and 75 seconds, and 4 minutes of singing by the male. Of 4 such bursts May 25-30, only one came "at once" and the others after 30 seconds, 6 and 7 minutes. Of 3 such bursts June 17-19, the intervals were 15, 60, and 75 seconds.

"Responsive" singing. Paired birds of a number of species sing "responsively." Such song is of three types: (1) the singing of the male inspires the female to sing—apparently the reverse of this order is uncommon—but the songs of the two birds are entirely uncoordinated; (2) the two birds sing song for song in alternation; (3) the female's notes begin as the male's end and the phrases of the pair, thus added together without a perceptible break, comprise the species song.

As has been indicated, the song of the female Wood Thrush was, for the most part, responsive to the male's in the first sense. So also was the song of female Bicknell's Thrushes (Wallace, 1939:338). Only once did I observe responsiveness of the second type by the Wood Thrushes: on May 15, while singing away from the nest, the female for a very short time "answered" the male's song phrase for phrase; this appeared to be a chance occurrence.

On one occasion (May 23) the male Wood Thrush sang in response to the female; after she had given two songs from the nest he broke more than 25 minutes of silence by singing half a dozen low phrases from a favorite perch, then flew within a foot of the nest for a few seconds (his whereabouts during his silent period were not known).

Only one other time did the song of the female Wood Thrush appear to influence the male's behavior in any way. On May 15, immediately after she had sung her second song within 45 seconds, the male flew from a perch about 50 feet away to one within 2 feet of her; then after a minute's idleness both birds flew to the ground and foraged.

Shaver (in Laskey, 1944:27) states that in response to song by the female Cardinal (*Richmondena cardinalis*) the male may appear and feed her or copulate with her.

Masculinity in the female. Saunders (1929:17) was "inclined to think that in most cases singing females . . . possess some trace of masculine characteristics." Nice (1943:127) found that to be true of singing female Song Sparrows insofar as their song was "always given from an elevation . . . in contrast to the female's usual behavior of staying close to the ground," and (p. 128) insofar as two out of four outstanding singers were (at least on occasion) "both unusually aggressive in defending their territories"; however, she noted that one of those two females had a normal nesting history, while the other for three straight years was the earliest layer of all her birds.

As already noted, the female Wood Thrush always sang from elevated places. Which bird of the pair occupied the higher or more commanding spot at the times the female sang could seldom be determined with certainty. However, twice the female was higher than the male, and twice I think she was lower, when his song moved her to sing (there was no correlation between her relative position and the promptness of her response); she once was higher than he, and once on about the same level, when she sang with no observed stimulus. Wallace relates (1939:338) that female Bicknell's Thrushes when they sang were sometimes above and sometimes below their mates.

This singing female Wood Thrush was no more active in defense of territory than the female of a pair that I studied intensively in the preceding year (1943:82); once I imperfectly saw an apparent defense against another Wood Thrush, and once the female helped her mate drive off a Blue Jay (*Cyanocitta cristata*).

Summary

A female Wood Thrush, studied in Baltimore in 1943, frequently sang during the laying and incubating stages of her two nestings. Her songs differed in form from those of males, and were weaker and less musical. She sang less during her second nesting than during her first. She sang both from the nest and from perches out in the territory, chiefly in the early morning and the evening. The male's singing was the commonest stimulus observed. Except on one (apparently chance) occasion there was no coordinated responsiveness in the singing of the two birds. Only twice was the male observed to react to his mate's singing: both times he flew to her, once first responding with a few songs. This female showed no other signs of masculinity.

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NOTES ON TEXAS SEASIDE SPARROWS

BY LUDLOW GRISCOM

IN 1944 I published a "Second Revision" of the Seaside Sparrows, *Ammospiza maritima,* which was primarily a study of Gulf Coast variations based on superb material assembled by George H. Lowery, Jr., at Baton Rouge. I was in no position at that time to make a critical study of the birds of the Texas coast then assumed to be *sennetti* Allen, and my few notes were prefaced with the remark that our knowledge of *sennetti* "really lags behind that of any other subspecies at the moment."

In January 1946 Dr. Max M. Peet offered me the opportunity to examine his series of *Ammospiza maritima* from the Texas coast, collected by H. H. Kimball. No less than 68 of this series come from localities other than the type locality (Corpus Christi, Nueces Bay), and the degree of individual variation in 65 specimens, all presumably from Matagorda (on the north arm of Matagorda Bay near the mouth of the Colorado River), is as great as that shown by *fisheri* on the coast of Louisiana (Griscom, 1944). Additional specimens from the Museum of Comparative Zoology and a kind loan, through the courtesy of Dr. John T. Zimmer, of 32 specimens from the American Museum of Natural History result in a grand total of 180 specimens from the coast of Texas from Galveston Bay southward, including every locality of record. They prove that the present systematic concept of *sennetti,* as well as the present definitions of the ranges of *sennetti* and *fisheri,* requires substantial revision.

Historically, systematically, and nomenclaturally, the characters of *sennetti* are those shown by a large series from the vicinity of Corpus Christi, the type locality; a total of 80 before me were collected from 1891 (F. M. Chapman) to 1935, between early October and early June (all birds collected after early April are more or less badly worn). It appears that all published diagnoses of this subspecies are correctly based on the characters displayed by the great majority of this series. The series shows a minor variation already described (Griscom, 1944: 323): two thirds have a grayer tone above; one third are more olivaceous. But it is the extreme variations in the series which are of particular interest:

1. Slightly darker above, that is, *browner;* dusky crown stripes more distinct; dusky and white streaking on back more distinct; chest band deeper in color and more distinct.
   1a. One extreme specimen (M.C.Z., Thayer Collection No. 14747).
   1b. Nine other specimens, not so extreme.
2. Normal (average), either grayish or olivaceous above—61 specimens.

3. Extremely pale and gray above—7 specimens.

4. Extremely olive and yellow above—2 specimens (La. State Univ. Mus. Zool. See Griscom, 1944:323).

The darker extreme of Variation 1 could be interpreted as the predicted "dark phase" of *sennetti* (Griscom, 1944:323), although the degree of difference between the dark and light phases would be very much less than in any other subspecies of *maritima* in which two definite phases have been described.

Actually my prediction of a dark phase in *sennetti* proves correct and raises a point of some historical interest. In 1891 F. M. Chapman went to Corpus Christi and was guided by J. M. Priour to the head

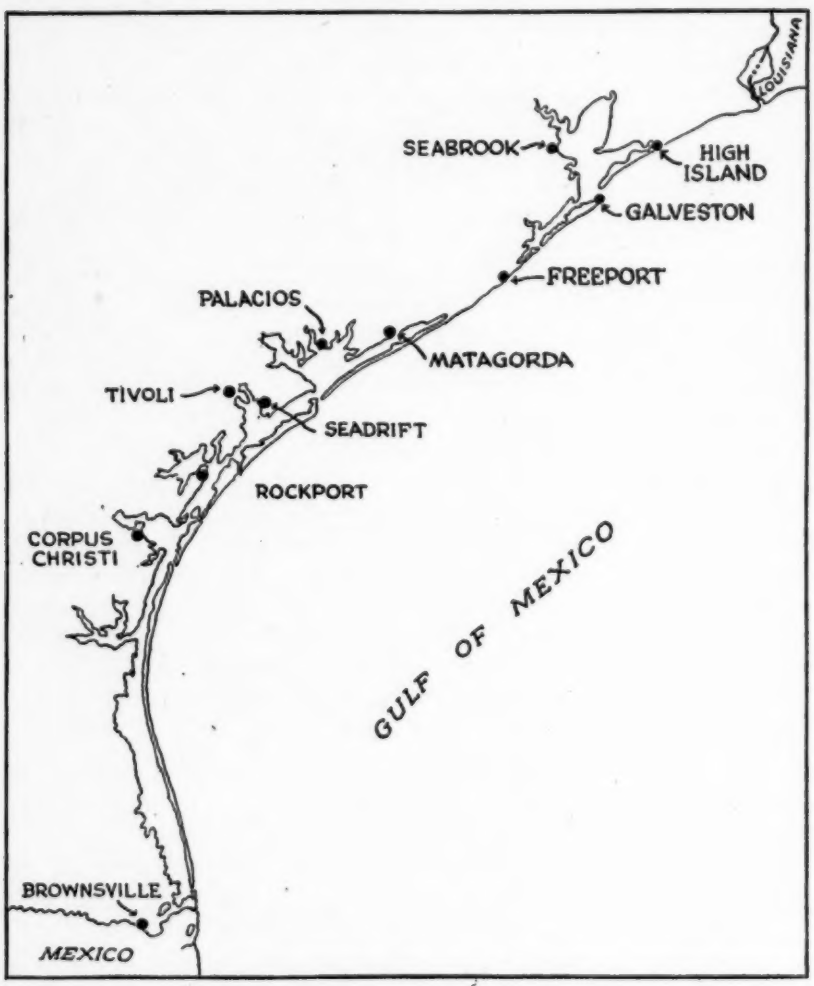

Figure 1. Sketch map of the Texas coast.

of Nueces Bay. Here, in a marsh near the mainland end of the "Aransas Railway trestle," he collected two dark birds and saw three others, noting especially that no typical *sennetti* were present in that particular locality, although he found them common in other marshes of Nueces Bay. He recorded the dark birds (1891:324) as *"peninsulae?"*, but actually they are indistinguishable from light phase *fisheri*, a race not described until 1899. Chapman was inclined to suppose that the dark birds were migrants, but Priour insisted that such dark birds were resident throughout the year, and later, when Chapman described *fisheri*, he gave *sennetti* full specific rank. Griscom and Nichols (1920: 24) recorded these dark specimens as *fisheri* and assumed that they were migrants.

Rhoads (1892:98–99) made a trip to Corpus Christi in late May 1891 and was guided by Priour to the same localities where Chapman had collected. Rhoads explicitly states (p. 112) that they made every effort to find some dark Seaside Sparrows but without success. The fact is that for the next 45 years, Seaside Sparrows were collected in Nueces Bay in fall, winter, and spring without other dark birds turning up, with one supposed exception: a specimen (U.S.N.M.) collected by F. B. Armstrong on March 19, 1899.

As I see it, only two inferences are possible from this meager evidence. If Priour was wrong, we have to explain why *fisheri* used to migrate to Nueces Bay, Texas, and now no longer does so. If Priour was right, a dark phase of *sennetti* formerly existed there and has now died out. Evidence to be presented from other coastal localities north of Nueces Bay will give preponderance to the second inference. Moreover, we must recall in this connection that *fisheri* is now proved to be a permanent resident at all localities of record in Louisiana and Texas.

The Texas series of specimens is best described by working north and east up the coast, commenting on the characters possessed by specimens from each locality of record. Crossing Nueces Bay (1) and proceeding northward we come to the Rockport peninsula, bounding Copano Bay on the east.

2. Rockport. Two specimens—typical *sennetti*. (The patches of marsh are scarce and scant, and the majority have been destroyed by civilization in the past 25 years. The Seaside Sparrow is nearly extinct locally.)

3a. Seadrift, head of San Antonio Bay on the east side. Two specimens—minutely browner than typical *sennetti*.

3b. Tivoli, head of western arm of San Antonio Bay. Six specimens (A.M.N.H.), collected in *mid summer*, are of vital importance. Two are juveniles of no use systematically. But of the four adults, three are clearly normal (light phase) *fisheri*, and one is *sennetti* but

minutely browner than typical *sennetti*. All are obviously worn, breeding adults; it is impossible to claim that the specimens of *fisheri* were migrants. Both types of coloration were taken at the *same place* on the *same day*, hence we have here the same type of evidence as that furnished by George H. Lowery, Jr., for Louisiana, which proved the existence of two color phases in *fisheri*.

4. Palacios, middle of Matagorda Bay. One specimen—obviously browner than typical *sennetti*.

5. Matagorda, on the north arm of the Bay at the mouth of the Colorado River. A great series in Dr. Peet's collection (although the data on some are questionable) breaks up as follows:

a. 14 are the normal dark phase of *fisheri*.
b. 32 are the intermediate phase of *fisheri*.
c. 12 are the normal pale phase of *fisheri*.
d. 5 are the extreme pale phase of *fisheri*.
e. 2 resemble *sennetti* but are obviously browner.

I hasten to add that I do not wish to be held to the exact numbers in the first four categories. On four occasions in the last year, after a good interval, I sorted the birds into these four categories, never reaching the same results twice. Actually the series is sufficiently large, so that one extreme passes into the other extreme by a perfect gradation.

6. Freeport, Brazoria County, at the mouth of the Brazos River. Three specimens—*fisheri* in the intermediate phase.

7. Seabrook, on the west side of Galveston Bay. Two specimens—*fisheri*, intermediate and pale phase respectively.

8. High Island, on the east side of Galveston Bay. A fine series (A.M.N.H., Dwight Collection) is *fisheri* in the light phase. These birds have always been called *fisheri*, and for many years this locality has marked the southernmost, or westernmost, limit of this subspecies.

The evidence submitted above can be summed up in the following generalizations:

1. Typical *sennetti* is unknown north of Rockport, Copano Bay.
2. An overwhelming majority of Seaside Sparrows from San Antonio Bay (Seadrift) northward are indistinguishable from *fisheri*.
3. The existence of a dark and light phase of *sennetti* is proved.
4. The light phase is apparently very rare northward of Rockport, Copano Bay; the dark phase is very rare or extinct southward.

5. Actually, "typical" *sennetti* of current textbooks and descriptions is an extreme development of the light phase.

6. The few birds of the *sennetti* type from San Antonio Bay (Seadrift) northward are surprisingly alike, being darker (*browner*) than typical *sennetti*. Actually, however, they are inseparable from certain extremes of topotypical *sennetti* described above as Variation 1, and also inseparable from certain extremes of the light phase of *fisheri*, notably reference specimen La. State Univ. Mus. Zool. No. 6162 (see Griscom, 1944:319), thus establishing an interesting type of intergradation by individual variation.

The question now arises, how are these facts to be expressed systematically and taxonomically? An interesting letter received from Dr. Peet suggests that since the very great majority of specimens from the Texas coast south to Seadrift, San Antonio Bay, are indistinguishable from *fisheri*, they must be named *fisheri*. With this reasoning I heartily agree. Since the few specimens of the "*sennetti* type" from north of Seadrift are inseparable from extremes of *fisheri* from Louisiana, no violence is done in naming them *fisheri* also. I therefore formally propose that:

1. The range of *fisheri* be extended south to San Antonio Bay (Seadrift), Texas.

2. The range of *sennetti* be defined as "Restricted to Nueces and Copano Bays, coast of Texas."

The only taxonomic difficulty that arises is how to name the few dark birds in existence from Nueces Bay which are indistinguishable from *fisheri*. The problem can be finally settled only by competent field work in the breeding season at Nueces Bay. In the meantime, protagonists of the migration or storm waif theories, who would call dark birds from Nueces Bay *fisheri*, and light birds from farther north *sennetti*, can reflect on the fact that both types breed at Tivoli, the exact halfway spot.

It should be noted that Brownsville is dropped from the range of *sennetti*. I was originally responsible for this extension of range (1926. *Auk*, 43:24). It was based on four specimens collected in November 1909 by J. M. Priour at "Brownsville," purchased by Dr. L. B. Bishop from F. B. Armstrong. Actually, the original labels had been removed, Priour never collected at Brownsville, and Armstrong bought the balance of Priour's collection after his death. Armstrong is well known to have labeled "Brownsville" everything from Corpus Christi to Tamaulipas, and both Priour and he made out series of tags ahead of time. Thirty years of field work and search have failed to discover a breeding colony of Seaside Sparrows south of Nueces Bay. If any form of

the species has ever occurred near the Mexican border, it must have been a straggler on migration. I am much obliged to Mr. A. J. Duval, of the Fish and Wildlife Service, and to Drs. Herbert Friedmann and Peet for assistance in tracing the history of these specimens.

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NOTES ON BIRDS OF THE GOMEZ FARIAS REGION OF TAMAULIPAS [1]

BY STEPHEN W. EATON AND ERNEST P. EDWARDS

ON June 20 and 21, and again from August 4 to 7 in 1946, we collected and made observations on birds in the Gomez Farias region of southwestern Tamaulipas, Mexico. The information in the following paper is presented as a supplement to the thorough report by George Miksch Sutton and Olin Sewall Pettingill, Jr. (1942),[2] which was based largely on the work in this area of the Cornell University-Carleton College Expedition from March 12 to May 4, 1941.

We recorded four species not listed in that report, *Columbigallina talpacoti, Sittasomus griseicapillus, Habia* sp. and *Basileuterus rufifrons*. In addition, we obtained further data on the extent of the breeding season and noted the presence of several migrants from the north (in the first week of August).

The State of Tamaulipas, bounded on the east by the Gulf of Mexico and on the north by Texas, includes part of the great mountain range known as the Sierra Madre Oriental, which runs through the southern and central portions of the State near the western border. Streams draining the eastern slopes of this mountain range in the vicinity of Gomez Farias join to form the Rio Guayalejo, which flows generally southward to the Rio Tamesi. Near the coast, the Tamesi forms part of the Tamaulipas-Veracruz border, emptying into the Gulf of Mexico at Tampico. It was close to the easternmost ridges of the Sierra Madre, along one of the tributaries of the Rio Guayalejo, that we camped in 1946. (See Map 1.)

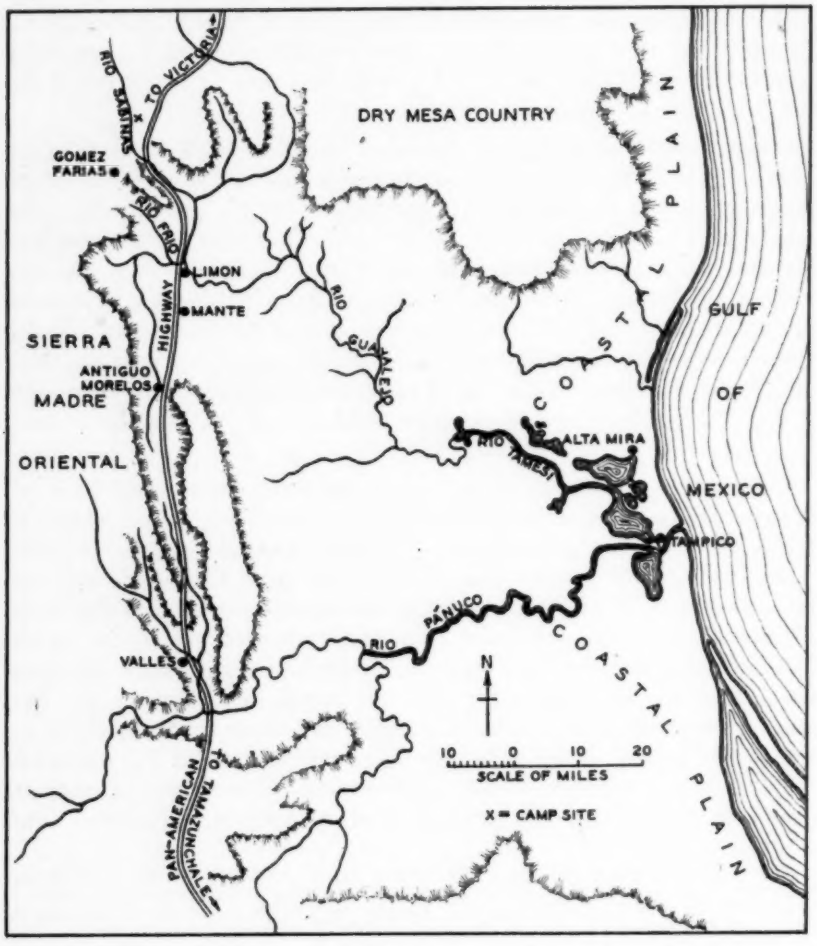
Our camp site, about 30 feet above the water on the east bank of the Rio Sabinas, was on the E. W. Storms ranch, called "Pano Ayuctle," the Aztec name for "pumpkin ford." Pano Ayuctle is about 88 kilometers south of Victoria, Tamaulipas, and three kilometers west of the Pan-American Highway opposite kilometer-mark 618 (north from Mexico, D.F.). Mesquite and wild pineapple thickets border much of the branch road to Pano Ayuctle. In the numerous small clearings near the river, corn and sugar cane are the principal crops. We frequently encountered plantings of mangoes and citrus trees, chiefly lime, lemon, and orange, in the vicinity of the dwellings, and at Pano Ayuctle these were supplemented by a few coffee trees and ornamentals, such as the royal palms lining the entrance road, flamboyants (*Delonix*), and

[1] To Dr. George M. Sutton, of the University of Michigan, we are grateful for numerous suggestions helpful in the preparation of this report. The specimens mentioned are now in his collection. Dr. Robert T. Clausen, of Cornell University, kindly helped with the identification of some of the plants. The U.S. National Museum and the U.S. Fish and Wildlife Service generously allowed access to their bird collections.

[2] "Birds of the Gomez Farias Region, Southwestern Tamaulipas," *Auk*, 59:1–34.

Spanish cedars (probably *Cedrela mexicana*). Along the river are many cypress trees, frequently with the epiphytic strangling fig wound about their trunks. Under these trees are thickets of dense tropical vegetation covering the few feet between the river and the edge of the cultivated area. At our camp site, the river was about 50 feet wide, and 8 feet deep at the deepest point, while upstream and downstream it was constricted and shallowed into riffles at frequent intervals.

On four occasions, one of us made a trip to the small range of hills west of the Rio Sabinas; this area will be referred to as "the mountain." To reach the mountain it was necessary to ford the river and walk west along trails which traversed the valley floor. Along these trails



Map 1.

were thick second growth tangles with, here and there, a few clearings planted in corn. Unbroken forests of tall trees covered the mountain, and beneath the trees were small patches of wild pineapple and bamboo. Large rocks littered the ground and often formed crevices which extended 20 or more feet straight down from ground level. It was in this mountain forest that many species of birds concentrated in flocks early in August to feed on the ripening fruits of the trees. Intensive field work along the eastern slopes of this range in August and September should yield important data on bird distribution.

A striking feature of the upper Rio Sabinas is a huge circular spring called in Spanish the *nacimiento*—literally, *birth* [of the river]. This spring is approximately 75 feet in diameter and furnishes most of the water for the river—at least to the Pan-American Highway crossing, approximately 25 kilometers downstream. The spring is bordered on the west by ledges of stratified rock, while on the northeast side a small drainage stream from the valley above empties into it. Seepage water trickles down over the rock ledges but adds no appreciable amount to the great flow of water rising from the depths of the pool. The stream flowing into the *nacimiento* contributes probably no more than a twentieth of the volume of the river except during the rainy season.

The reason for the occurrence of many peculiarly neotropical birds along the Rio Sabinas and adjacent foothills of the Sierra Madre Oriental (Gomez Farias region) is evident upon examination of the physiography of the region. (See Map 1.) The three factors which we think have a direct effect in making this region the northern limit of distribution for certain birds are:

a. The humid forest which is more or less continuous along the eastern slopes of the foothills of the Sierra Madre Oriental from Veracruz northward to a point approximately 50 miles south of Victoria, Tamaulipas. The humidity of this strip is maintained by the easterly winds coming off the Gulf of Mexico, rising on reaching the mountains, and precipitating rain along the eastern slopes. The cloud-banner mentioned by Sutton and Pettingill (1942) [2] is probably the result of these climatic conditions.

b. Large rivers, such as the Tamesi and Guayalejo, up which birds make their way from the coast.

c. The dry mesa country north and east of the Rio Sabinas, which extends from the Sierra Madre Oriental nearly to the Gulf of Mexico and acts as a barrier to further northward extension of such humid-forest birds as *Sittasomus griseicapillus* and *Cyclarhis gujanensis*.

It is interesting that in early August, while some northern migrants were already moving southward through the Gomez Farias region along the Sierra Madre Oriental, several of the local species of birds were still nesting or feeding young-on-the-wing.

Species not Previously Recorded from the Region

Columbigallina talpacoti. Ruddy Ground Dove. On August 7 Eaton saw four of these birds on the mountain at about 1,000 feet elevation. They were flushed from the forest floor, where they had apparently been feeding on fruits which had ripened and dropped to the ground.

Sittasomus griseicapillus sylvioides. Mexican Sittasomus. On August 6, on the mountain at about 800 feet elevation, Eaton collected a male specimen with small testes. Two Canyon Wrens (*Catherpes mexicanus*) were moving about and singing when the little Sittasomus flew to a nearby tree. It acted much like a Brown Creeper (*Certhia familiaris*), creeping up one tree and then flying to the bottom of another and starting up again. It made no sound of any sort. On collecting it, we noted that the iris was dark brown and the tarsi gray. The molt was apparently complete except that the three outermost primaries were still more or less sheathed at the base. The outermost primary of the right wing was missing. That of the left wing measured 20 mm.; the next, about 37 mm.; the third (from the outside), 61 mm. In a comparable non-molting specimen the same feathers measure, respectively, 46, 60, and 66 mm.

On August 7, Eaton saw another Sittasomus farther up the mountain—at about 1,000 feet.

Our Gomez Farias specimen is larger (wing 83, tail 83 mm.) than the specimens of *sylvioides* from Veracruz in the United States National Museum and is slightly duller on the rump and upper tail coverts. However, considering the extreme freshness of the plumage (which affords maximum wing and tail measurements), we place the bird with this race for the present. So far as we have been able to ascertain, the species has never before been recorded from Tamaulipas.

Basileuterus rufifrons. Rufous-capped Warbler. Eaton saw one of this species August 6 at the foot of the mountain at the edge of a clearing.

Habia sp. Ant tanager. Eaton saw four or five ant tanagers on the mountain in dense bamboo thickets under tall forest trees on August 7. The birds were travelling in a noisy little group and were quite difficult to approach.

Notes on Nidification

Columba flavirostris. Red-billed Pigeon. On March 18, 1941, Lea (Sutton and Pettingill, 1942) [2] noted a Red-billed Pigeon with a twig in its bill. On June 20, we saw one carrying nesting material into a monkey's-ear tree (*Pithecolobium*).

Scardafella inca. Inca Dove. Pettingill (Sutton and Pettingill, 1942) [2] found a nest of this species with two heavily incubated eggs on March 30, 1941. In 1946, we learned from a local ranch owner that a pair of Inca Doves had just successfully raised young in a tree in his yard during the latter half of June. On August 5, Eaton flushed an Inca Dove that was incubating two eggs. These facts indicate that the species nests through at least six months of the year in this region.

Crotophaga sulcirostris. Groove-billed Ani. On June 20, Edwards saw an adult make several trips with food to a small tree near our camp and presumed it was feeding young. On August 7 we noticed almost full-grown young Anis moving about in little groups.

Tyrannus melancholicus. Olive-backed Kingbird. Edwards saw this species feeding nearly full-grown young on August 6 near the foot of the mountain.

Myiozetetes similis. Social Flycatcher. On June 20 Edwards discovered a nest in a small clump of Spanish moss (*Tillandsia* sp.) which hung from a vine attached to a tree branch high above the river. Its owner was apparently feeding young.

Parula pitiayumi. Pitiayumi Warbler. On August 5, Edwards saw an adult feeding a young bird just out of the nest.

Tanagra lauta. Bonaparte's Euphonia. In the afternoon of June 20, Eaton saw a young bird hunting food near an adult female. When the adult caught an insect, the young stopped its ineffectual bug hunt and begged—chipping, and vibrating its wings. The young was like the female but with lighter yellow on the breast and lighter olive on the back. On August 7, Edwards saw a male and female building a nest near the river in a small mass of Spanish moss at the end of a pendant branch. They made several trips to the nest carrying small pieces of what appeared to be thin bark, entering the clump of moss through a poorly defined opening in the side.

Fall Migrants

Actitis macularia. Spotted Sandpiper. On August 5, Edwards saw this species at the *nacimiento.* Later in the day, at two points along the river between the *nacimiento* and Pano Ayuctle, we saw the species again (single individuals).

Mniotilta varia. Black and White Warbler. On August 7, Eaton saw one of these warblers in the forest on the mountain, at about 900 feet elevation.

Seiurus motacilla. Louisiana Water-Thrush. On August 5, we saw single birds at three localities along the Rio Sabinas between the *nacimiento* and Pano Ayuctle. We heard one give a whisper-like song.

Icterus spurius. Orchard Oriole. On August 6, Edwards saw an adult male, which we presume was a migrant, in a large tree near the edge of a cornfield west of the Rio Sabinas near Pano Ayuctle.

Miscellaneous Notes

Ictinia plumbea. Plumbeous Kite. We saw single Kites on June 20 and 21, and on August 5 saw two perched in the top of a large cypress tree two miles upstream from Pano Ayuctle. One of these was immature with a streaked breast and short tail; the other was adult.

Claravis pretiosa. Blue Ground Dove. We saw this dove for the first time on August 5 about a mile from Pano Ayuctle. August 6 and 7, Eaton saw three on the flat land near the base of the mountain. Sutton and Pettingill (1942) [2] included the species in their list on the basis of one sight record.

Cyclarhis gujanensis flaviventris. Mexican Pepper Shrike. On August 7, Eaton shot a molting female on the mountain at about 800 feet elevation. When first seen, it was hanging almost upside down on a swaying branch. Its actions reminded Eaton of the behavior of a parrot. Pettingill (Sutton and Pettingill, 1942) [2] took the only specimen heretofore recorded in Tamaulipas.

Laboratory of Ornithology, Cornell University, Ithaca, New York

GENERAL NOTES

The American Bittern in Puerto Rico.—On November 14, 1947, a female specimen of the American Bittern (*Botaurus lentiginosus*) was brought to me by Mr. Luis Santos, who had killed the bird near a small ciénaga northwest of the town of Añasco, Puerto Rico, densely covered with *Typha* associations and other thick clumps of plants typical of swampy areas. According to Mr. Santos, the bittern was feeding on the mudflats south of the swamp. The specimen (No. 918) is on deposit at the Institute of Tropical Agriculture, Mayaguez, Puerto Rico.

As far as I am aware, this constitutes the only recent record of the occurrence of the American Bittern in Puerto Rico. The last record known was that of Danforth (1925. "Birds of the Cartagena Lagoon," *Jour. Dept. Agric. Porto Rico,* 10:46), who flushed one bird in Cartagena Lagoon on the southwestern corner of the island, on November 30, 1923.

Bond (1945. "Check-list of Birds of the West Indies," p. 10) records the species as wintering southward to Panama, and: "Not uncommon winter resident in Cuba. Also recorded from Puerto Rico, Grand Cayman, Swan Island and from the Bahamas (New Providence). Should also be found in Hispaniola and Jamaica, though records of its occurrence on these islands are unsatisfactory."

Wetmore (1927. "The Birds of Porto Rico and the Virgin Islands," *N.Y. Acad. Sci., Sci. Surv. of Porto Rico and the Virgin Islands,* 9:303) states that the American Bittern is a migrant straggler in Puerto Rico and cites three definite records (1873, 1921, and "a skin in the collection of Blanco"), as well as the 1923 record of Danforth.—VENTURA BARNES, JR., *Division of Fisheries and Wildlife, Department of Agriculture and Commerce, Mayaguez, Puerto Rico.*

Anting by some Costa Rican birds.—Within recent years, the curious phenomenon of "anting" has received considerable attention from ornithologists, and numerous observations have been published, especially in the *Wilson Bulletin* and the *Auk*. In view of this widespread interest, it seems desirable to put on record a few instances of anting that have come to my attention in Costa Rica during the last dozen years. My first observation was made at a time when most of us had never heard about anting, and I shall give it as I recorded it in my journal on October 28, 1936: "Today at noon the pair of Buff-throated Saltators, *Saltator maximus* [a big, thick-billed, olive-green member of the finch family], that frequently come into my yard, flew into the lemon tree in front of the cabin, and one of them behaved most unusually. It perched on a slender ascending branch supporting a grayish nest inhabited by fat brown ants of medium size and began to pick off the ants with its bill. It held its right wing extended in such a fashion that the primary feathers shielded the side of its breast and belly, and every time that it picked up an ant, it rubbed its bill rapidly against these feathers. Then it seemed to eat the ant, but of this I could not make sure, for the creatures were too small for me to distinguish them in the bill. Once it climbed up very close to the nest to pick the ants from its surface, and here a leaf interfered with its reaching its wing, which was held forward as before. As a result, the bird rubbed its bill against the leaf instead of against its flight feathers. Was this rubbing against wing or leaf for the purpose of killing the ant?"

My next observation was made more than nine years later, and the actor in this instance was a little, sharp-billed flycatcher, *Pipromorpha oleaginea*. On November 7, 1945, while walking along the creek in front of my house, I found a lone male (I could tell the sex by the yellow corners of the mouth) in a little tree growing on the bank. He plucked a small, dark object from the foliage; then holding it in the tip of his bill, he rubbed it along the inner surface of the remiges. As he did this, his wing was slightly opened and his tail bent forward

under the perch. The object in his bill then disappeared, but he found another, and rubbed it beneath his wing. He did this several times over. I could not actually distinguish what the bird held in his bill, but after he flew off I found in the tree a small silken ants' nest; a number of the blackish ants were crawling over the boughs and foliage. Without much doubt the flycatcher had been anting.

Early in the morning of April 8, 1947, I met a lone Barred Woodhewer (*Dendrocolaptes certhia*) just within the edge of the tall second-growth woods beside a pasture. It picked from the bark of a tree a big, dark-colored insect (which might have been an ant), held it in the tips of the mandibles, rubbed it beneath a wing, then swallowed it. Next it clung to the side of a large silken ants' nest that it found near by, apparently plucked off an ant, and extending its wing forward, rubbed the ant beneath the partially spread primaries. Again it clung to the ants' nest and again passed its bill beneath a wing. It did this several times more. While passing its bill beneath its wing it perched or rather clung to slender branches or vines near the ants' nest, in a posture I had never before seen a woodhewer take, but somewhat in the manner of a perching bird. That this was not a natural or secure position for the big tree-climbing bird was attested by the fact that several times it lost its balance and seemed on the point of falling off. Except in the first instance, I could not see whether it swallowed the ants which, apparently, it rubbed beneath its wings.

My fourth and last example concerns the tiny Variable Seedeater (*Sporophila aurita*). It is less convincing than my other three instances of anting, because I could find no ants in the bush where I saw the bird perform; but her actions were certainly those of a bird anting, and no other explanation of her odd conduct occurs to me. Early on the morning of May 27, 1947, a female Seedeater flew into the cestrum bush in front of the house. She searched diligently over the slender branches until she seemed to find some tiny object. Then, standing high and bringing her wings forward, she rubbed her bill (and doubtless what she held in it) beneath her remiges. She did this repeatedly, each time after picking from a branch some small object which she had difficulty in finding. Once she rubbed her bill beneath a wing while clinging upside down to a twig. When she flew off I looked for ants in the bush but saw none—strangely enough, for ants are usually on everything in this region. The bird herself needed to hunt hard for them—if this is indeed what she sought—and must have used practically all of the available supply.

In the north temperate zone, birds have nearly always been observed anting on the ground, but here in the tropics I have seen birds anting only in trees and bushes. I believe that in Central America far more species of ants live in trees, either in nests of their own construction or in cavities and crannies of various sorts, than in the ground. The only terrestrial ant-hills at all abundant in this region are those of the leaf-cutting or parasol ants (*Atta*) and of the fire-ants (*Solenopsis*). The stingless attas are hard, spiny morsels which would hardly seem to lend themselves to anting, and the birds seem to leave the well-named fire-ants strictly alone. The first three birds that I saw anting performed close beside the silken nests that are woven about the foliage of trees and bushes by *Camponotus senex textor* (specimens identified by Dr. M. R. Smith of the U. S. Bureau of Entomology). This is a blackish, stingless ant of medium size that is exceedingly abundant in the clearings and in the light vegetation in El General, although not found in the big forest unless it be high up in the sun-bathed tops of the trees where it might escape detection. The adult ants themselves are no more capable of secreting silken thread than adult butterflies and moths, but their larvae do; holding the white grubs in their mandibles and moving them back and forth, the workers cause the larvae to spin thread where it is needed for building or repairing the grayish irregularly formed nest.—ALEXANDER F. SKUTCH, *San Isidro del General, Costa Rica.*

The Wood Duck in New Mexico.—On October 19, 1947, Hugh B. Woodward, H. H. Drum, and Walter Bellman brought in a bag of ducks taken on a marsh one mile south of Bernardo, Socorro County, New Mexico. In this bag were two Wood Ducks (*Aix sponsa*), a male and a female, both immature and both molting heavily. I saved these as specimens; the female is now in the collection of the University of Michigan Museum of Zoology, the male in Dr. Max M. Peet's collection (also housed in the Museum). So far as I can learn, no New Mexican specimen has previously been preserved, nor have any sight records been published since 1928.

W. W. Cooke (in F. M. Bailey's "Birds of New Mexico," 1928, p. 131) quotes Thomas C. Henry on the status of the Wood Duck in New Mexico: "but two or three were ever met with, and only on the Rio Mimbres." (Henry was stationed at Fort Webster, east of Silver City, on the Rio Mimbres from December 1852 to early 1854.) Cooke also notes one sight record made by William H. Emory near Las Palomas (south of Hot Springs) on October 12, 1846.

Recent observations of the Wood Duck in New Mexico are as follows: John C. Knox, of the U. S. Fish and Wildlife Service, examined a Wood Duck taken by a hunter at San Marcial, Socorro County, during the open duck season in 1944. During the open season in 1945, Knox examined a second Wood Duck killed by a hunter at San Marcial and also saw one in flight at the same location. In 1946 Knox observed one adult male Wood Duck on a pond in Tingley Park, Albuquerque, Bernalillo County. Thomas G. Cornish killed a male Wood Duck in December 1946 on the Rio Grande 10 miles north of Albuquerque, and on December 22, 1947, he saw another one at the same location. On January 7, 1948, Roger Tory Peterson and I observed two male Wood Ducks in prime plumage on a pond in Tingley Park, Albuquerque. They were tame enough for close observation though they did not join other ducks and geese in taking food thrown to them. I observed a male Wood Duck on the same pond on February 25, 1948.

Charles T. Vorhies (1947. *Condor*, 49:245) has outlined a remarkably similar story of the Wood Duck in Arizona.—A. E. Borell, *Soil Conservation Service, Albuquerque, New Mexico.*

Unusual consumption of fish by three species of birds.—On September 2, 1947, I noted a large concentration of birds of several species on the Souris River below the spillway downstream from Lake Darling, an artificial lake on the Upper Souris National Wildlife Refuge in North Dakota. The birds appeared to be feeding almost exclusively—if not entirely—upon small fish. This was particularly noticeable in the tailrace below the spillway, where the water was black with a tremendous concentration of fingerlings. The tailrace was about 15 feet by 25 feet in surface area, deep, and without shallow margins, so that all birds feeding there were swimming. Two Greater Yellow-legs (*Totanus melanoleucus*), three Blue-winged Teal (*Anas discors*), and two Franklin's Gulls (*Larus pipixcan*) were noted swimming in the water and feeding voraciously upon the fingerlings, which averaged perhaps scarcely more than an inch in length. The fish seemed to be invariably swallowed head first, and consisted mainly of small chubs, shiners, and sticklebacks.

While yellow-legs not infrequently consume small fish in shallow water as a part of a meal, they are rarely found swimming, and only occasionally do they consume fish in large numbers. They frequent shallow margins and marshes, and it is rare for them to forage for food in deep water. It is also extremely rare for teal, or any species of river duck, to consume fish in appreciable quantity. They are primarily vegetable feeders and are most at home in shallow waters and mud flats. On this occasion, because of the great concentration of these small fish

and the relative ease with which they could be obtained, various species of birds were feeding primarily upon them.

The occurrence is a clear illustration of the fact, often not fully realized, that availability is an exceedingly important factor in determining food consumption and that the normal food habits of birds or other animals are often completely changed by an unusual availability of a particular item that is otherwise rare in their diet.—CLARENCE COTTAM, *Fish and Wildlife Service, Washington, D.C.*

Food of the Old-squaw in Lake Michigan.—For many years commercial fishermen of the Great Lakes have periodically encountered large numbers of Old-squaws (*Clangulà hyemalis*) in nets set in from 8 to more than 30 fathoms of water. The heaviest take of these deep-swimming ducks is reported to occur in nets set in from 8 to 16 fathoms. Reports on depths and numbers of birds have been recorded in detail by Schorger (1947. *Wils. Bull.*, 59:151–159). The question has often been raised whether the Old-squaws were seeking fish or pursuing their more usual food: insect larvae, small crustaceans, and mollusks.

On March 16, 1938, Durward L. Allen obtained data and stomachs of 36 Old-squaws from commercial fishermen at Saugatuck, Allegan County, Michigan. The series (21 females, 13 males, and 2 undetermined) included adults and immatures of both sexes.

The stomach contents of these 36 specimens were almost entirely composed of a small bivalve, *Pisidium* sp. (a total of 1,550 individuals, an average of 44 per duck), and a deep-water crustacean, *Pontoporeia hoyi* (a total of 1,295 individuals, an average of 36 per duck). A small number of another bivalve (*Sphaerium*), a few crayfish (*Cambarus*), snails (*Amnicola limosa* and *Gyraulus parva*), insect larvae (*Chironomus*, Orthocladiinae, *Prodiamesa*, *Spaniotoma*), and a small amount of vegetable matter had also been eaten. The only persisting parts of the crayfish were gastroliths, and it is possible that these, as well as the vegetable matter, were remains from food taken before diving into deep water.

The bathymetric distribution of the two principal food organisms, *Pisidium* and *Pontoporeia*, has been reported by Eggleton (1937. *Mich. Acad. Sci. Arts and Letters*, 22:593–611) for Lake Michigan. In the years studied, both these animals reached their greatest abundance in depths less than 60 meters (33 fathoms).

We thank J. W. Leonard for identifying the insects and F. E. Eggleton for verifying our determinations of the other invertebrates.—KARL F. LAGLER and CATHERINE C. WIENERT, *Department of Zoology, University of Michigan, Ann Arbor,* and *The Institute for Fisheries Research, Michigan Department of Conservation.*

A nest of the Spruce Grouse in east-central Saskatchewan.—On June 6, 1947, on our way from Nipawin, east-central Saskatchewan, to Fishing Lake, 75 miles northward, Walter A. Tholen and I stopped at the fire tower about four miles from the Fishing Lake cabin. Mr. Wicker in charge showed us a nest of the Spruce Grouse (*Canachites canadensis*) that he had found two days earlier. It was located at the base of a small broken white spruce about four inches thick, and there was a broken branch hanging over it. Dense sedges and grasses, nearly all of them dead, surrounded the site, and there were a few scattered branches of Labrador tea in the vicinity. The nest was 21 cm. in internal diameter and cupped to a depth of 4 cm. It was made of dead sedges, with a few feathers and finer sedges for the lining. (Plates 3 and 4.)

The nest contained seven eggs, spotted, over a rather uniform light buff background, with dark brown. The eggs averaged 42.3 mm. (extremes: 40.9–43.0) × 31.9 mm. (extremes: 31.2–32.5); and 20.5 grams (extremes: 19.8–22.0).

On June 6, when Mr. Wicker showed us the nest in the late afternoon, the female was incubating. On June 7 she was on the nest at 10 a.m., allowed me to approach within six feet, and I photographed her. The male was sitting in a

PLATE 3

Spruce Grouse nest and eggs. Near Fishing Lake, east-central Saskatchewan, June 7, 1947.

PLATE 4

Female Spruce Grouse, incubating. Near Fishing Lake, east-central Saskatchewan, June 7, 1947.

spruce tree only a short distance away. He allowed me to approach within 50 feet, then flew. I did not see him again. On June 7 I found the female on the nest at 10:00 a.m. and at 3:30 p.m.; at 5:17 p.m. she was still on the nest, and I watched her from then until dark. It was a cold cloudy day with a moderate northeast wind. At 8:43 p.m., in the dusk, the female suddenly flew directly from the nest, disappearing into a thick spruce-tamarack swamp. At 9:06 p.m. she again landed on the little spruce stump above the nest and dropped onto the eggs after looking carefully about her. It was nearly dark then because of the heavy clouds but was not entirely dark until 10:30 p.m. On June 9 I was back at the nest at 4:00 a.m., shortly after daybreak; the female had probably left and returned earlier, for she remained on the nest during the next eight hours. During two visits in the afternoon on the same day and two mid day visits on the following day (June 10), she was on the eggs. Thus during 12 hours' observation, she incubated for 11 hours and 37 minutes and fed 23 minutes on June 8 and 9, the 23 minutes being just before dark. She always sat on the nest facing out from the stump.

Female Spruce Grouse were observed along the roadway near our cabin on June 8 at 2 p.m. and June 9 at 1:30 p.m. They were dusting in some sand in the roadway.

Other birds in close proximity to the nest were Greater Yellow-legs (*Totanus melanoleucus*), Richardson's Owl (*Aegolius funereus*), Nighthawk (*Chordeiles minor*), Canada Jay (*Perisoreus canadensis*), Ruby-crowned Kinglet (*Regulus calendula*), and Myrtle Warbler (*Dendroica coronata*). On June 9 the Canada Jays landed only two feet in front of the Spruce Grouse on her nest, but she did not move; they hopped about her for several minutes. Red squirrels ran about her on numerous occasions, and two snowshoe hares scampered up and down the roadway at times, but she showed no sign of disturbance.—LAWRENCE H. WALKINSHAW, *1703 Central National Tower, Battle Creek, Michigan.*

A female Bob-white in male plumage.—On June 3, 1944, F. W. Buchanan collected a Bob-white, *Colinus virginianus*, in the valley of Elkhorn Creek, Lee Township, Carroll County, eastern Ohio. In all outward appearances, the bird was a typical male, but upon dissection, the specimen proved to have a somewhat enlarged and apparently functional ovary. The carcass was unfortunately not preserved; the skin (C.U.21567) has been deposited in the Louis Agassiz Fuertes Memorial Collection at Cornell University.

Mr. Herbert L. Stoddard informs us (*in litt.*) that in all of his experience with the Bob-white he has never collected an individual exhibiting such a condition, although on two or three occasions he has seen Bob-whites in the field whose behavior seemed to indicate a reversal of sex characters.

Two similar cases in wild birds of other species have come to our attention: one in the Spurred Towhee, *Pipilo maculatus montanus*, reported by Bergtold (1916. *Auk*, 33:439), and one in the Bay-breasted Warbler, *Dendroica castanea*, reported by Stoddard (1921. *Auk*, 38:117). In both cases, the birds, although wearing male plumage, possessed apparently normal, undiseased ovaries, with ova in various stages of development.

The plumage-determining mechanisms have been studied most thoroughly, as would be expected, in the domestic fowl. Whereas the results may not be applicable to birds in general, they are probably valid for a galliform species such as the Bob-white. Professor F. B. Hutt, of the Department of Poultry Husbandry, Cornell University, kindly directed our attention to the pertinent literature.

It is now well established that the secondary sexual characters, including plumage characters, of female birds are determined by a hormonal secretion of the ovary, which acts as an inhibitor to male secondary sexual characters. In

its absence, male secondary characters appear. There are innumerable cases on record of female-plumaged birds that have assumed male plumage and, upon dissection, have proved to have abnormal or diseased ovaries. In the extreme manifestation of this condition a female may actually become a functional male (Crew, 1923. *Proc. Royal Soc. London,* 95B:256–278).

It is somewhat more difficult, however, to explain the cases in which a male-plumaged bird acts and functions as a *normal* female. The best explanation seems to be that of Crew (1927. *Proc. Royal Soc. London,* 101B:514–518). According to Crew's theory, the ovaries of the birds in question undergo occasional periods of physiological inactivity, and the production of hormones is much reduced. If such a quiescent period coincides with the period of molt, the new feathers will be of the male type, since the inhibitory influence of the ovarian hormone is absent. After the pattern of the feathers has already been determined, the ovary resumes its normal activity in time to display the ordinary manifestations of the breeding season. Evidence for this theory of irregular production of ovarian hormones was provided by a Rhode Island Red fowl studied by Crew, which molted irregularly into male and female plumages in the following annual succession: male, female, male, male, female. In each plumage, the bird was a good and consistent layer.

In almost all large collections of bird skins there are specimens which, on plumage evidence, have been considered by workers examining them to be incorrectly sexed. It is possible that some of these were specimens like the Bob-white described above. The possibility serves to emphasize the importance of a description on specimen-labels of the condition of the gonads rather than a mere notation of the sex.—Forest W. Buchanan, *Amsterdam, Ohio,* and Kenneth C. Parkes, *Laboratory of Ornithology, Cornell University, Ithaca, New York.*

The eyesight of the Bluebird.—At "The Frith," near Butler, Pennsylvania, we have a pair of 4,000 volt power-distribution wires, crossing several hundred yards of the laboratory grounds, 30 feet up in the air. The herbage below is grass, briars, and low bushes not more than about two feet high.

Bluebirds (*Sialia sialis*) sit on these wires, their heads bent down, apparently intent on the gound below. Suddenly one of them will dive down, sometimes to a point perhaps 10 yards to one side of the point directly under the wire, instantly capturing a caterpillar, which he immediately takes, not to the wire itself, but to the power pole or cross arm supporting the wire, a more convenient perch for battering the grub into pulp. If, after sitting on the wire and watching for a time, he does not dive, he moves 10 or 20 yards along the wire, and sits and watches again. I can see no explanation except that he actually sees the caterpillar, up to 40 or 50 feet away, and deliberately uses the vantage point of the wire to study the area below quite minutely.

One caterpillar, we could see through the binoculars, was a large cecropia or allied form, but others were much smaller.

Hawks, we know, can see mice and other small objects from a much greater height, but we have supposed it was movement on the part of mice that betrayed them. Caterpillars of the cecropia type are very quiescent creatures, remaining motionless for long periods while they digest their food, then moving up the stem of the plant an inch or two to a convenient leaf, mowing it quietly into their mouths, then backing down to the stem and relapsing into a motionless condition. Most other caterpillars are comparably quiet. Yet the Bluebird spots them, even with a brisk breeze blowing so that all the vegetation of the countryside is in motion.

Most passerine birds seem to hunt their food in a myopic way, like the titmice and warblers and vireos, by diligent searching at close quarters. Old

World flycatchers and the American tyrant flycatchers, like these Bluebirds, watch from a vantage point, but it is one thing to see a lively, flying insect in mid-air, and quite another to see a lethargic, camouflaged caterpillar in the brush.—F. W. Preston and J. M. McCormick, *Preston Laboratories, Box 149, Butler, Pennsylvania.*

Home range and duration of family ties in the Tufted Titmouse.—The Tufted Titmouse, *Parus bicolor,* formerly considered rare in Michigan (Barrows, 1912. "Michigan Bird Life," pp. 692–694), now occurs in moderate numbers throughout the southern part of the State; yet we have little more information on the species than was available in the days when it was rare.

From December 1940 to the end of 1947 (85 months), I maintained a banding station at my home in Ann Arbor, a location favorable to birds, and I did some trapping and banding in every month—usually every week. In that period I banded 26 adult and 3 young Tufted Titmice. With the exception of one, banded March 11, the 26 adults were first taken between October 25 and February 23. Half of the adults (13) were never taken (or even identified) again—even though 17 of the 26 had been color-marked before being released; 11 were retaken or seen repeatedly between late spring and early fall (on 141 occasions in all). There is but one other bander (who traps only occasionally) and few observers in the region I studied; yet 5 of my color-marked Titmice were repeatedly trapped or reliably recorded by others within a .6-mile radius from my banding station. I found two nests of banded birds—.25 and .3 miles from the station. These data seem to indicate that there is no real migration of this species in Michigan (such as several writers have postulated) but that there are two classes of birds: *A,* those that remain in restricted home ranges throughout the year (hence repeatedly recorded in a small radius); *B,* those that wander (hence not recorded after banding). It seems reasonable to suppose that the former are fully adult birds; the latter, birds in their first winter wandering widely before finally settling on a home range.

Adults commonly came to the feeding station in twos, and in several cases I found banded and color-marked pairs remaining together for considerable periods. Such cases are: Pair 1, January 1942 through March, May 1942 through August, October 1942 through January 1943; Pair 2, December 1944 through May 1945; Pair 3, January 1941 through April. During these periods the pairs were seen together frequently, sometimes daily. Gillespie (1930. *Bird-Banding,* 1:113–127) has already presented some evidence for permanent mating of this species.

In the six-year study made in California by John B. Price (1936. *Condor,* 38:23–28) of 64 banded adults and 145 banded juveniles of the nearly related Plain Titmouse, *Parus inornatus,* 45 per cent of the adults (banded after being captured on the nest) were recaptured in subsequent years within 100 yards of the original nest site whereas only 1.3 per cent of the juveniles were recaptured. Most mates remained together for at least two or three years.

A more remarkable characteristic of the Tufted Titmouse was the continued association of the young with their parents. Adults often brought their young to my feeding station, in one case on the day of fledging (July 8)—from a nest a third of a mile away. One or more young sometimes continued to come with the adult pair for many weeks. In one case, two marked young, first brought by the adults (Pair 1, above) to the feeding shelf on June 22 (1942), continued to accompany the parents until November 8; after that date, only one young came with the adults, but it continued to appear with them until January 10 (1943).

The greatest age recorded for any of these Titmice I have banded is five years—for a bird (No. 138-104183) banded December 7, 1941, when it was at least six months old, and last seen four and a half years later (May 26, 1946). Two others were at least two and a half years old when last seen.—Josselyn Van Tyne, *University of Michigan Museum of Zoology, Ann Arbor.*

A Western Lark Sparrow from Florida.—While examining a series of Lark Sparrows (*Chondestes grammacus*) in the Louis Agassiz Fuertes Memorial Bird Collection at Cornell University, I came upon a specimen taken by Fuertes at Flamingo, Monroe County, Florida, on April 5, 1908. After comparing it with large series of both the western (*C. g. strigatus*) and the eastern (*C. g. grammacus*) subspecies at Cornell and at the University of Michigan Museum of Zoology, I have identified it as *strigatus*. McAtee, Burleigh, Lowery, and Stoddard (1944. *Wils. Bull.*, 56:152–160) have pointed out the tendency of many western birds to migrate in an easterly or southeasterly direction. They list (Table 1, p. 156) the Western Lark Sparrow from Louisiana and Mississippi, but I have been unable to find this subspecies recorded from Florida.—ROBERT M. MENGEL, *University of Michigan, Ann Arbor.*

Golden Eagles in Hidalgo, Mexico.—About mid morning on July 10, 1942, we saw one immature and two adult Golden Eagles (*Aquila chrysaëtos*) 10 miles north of Zimapan, Hidalgo. They sailed on set wings down the steep slopes of a mountain, crossed the Pan-American Highway a short distance ahead of our car, and continued over the valley until lost to sight. Although the Golden Eagle has been recorded from several localities in central Mexico, we have found no records from as far south as Hidalgo.—ROBERT M. MENGEL, *University of Michigan, Ann Arbor,* and DWAIN W. WARNER, *Minnesota Museum of Natural History, University of Minnesota, Minneapolis.*

EDITORIAL

The Thirtieth Annual Meeting of the Wilson Ornithological Club will be held jointly with the Ninth Annual Meeting of the Wisconsin Society for Ornithology in Madison, Wisconsin, April 21 to 24, 1949. Previous meetings have been held in the fall, but, following numerous requests from Members, the Council decided by mail ballot to hold the meeting in the spring. Technical sessions, demonstration sessions, popular sessions, and field trips are being planned by the combined Local Committees on Arrangements.

OBITUARY

ALDO LEOPOLD, forester, ornithologist, and conservationist, died April 21, 1948, near Fairfield, Wisconsin. He was born at Burlington, Iowa, January 11, 1887. After graduating from Yale he served in the Forest Service until 1924, when he was appointed Associate Director of the Forest Products Laboratory at Madison, Wisconsin. In 1933, he became Professor of Wildlife Management in the University of Wisconsin. He wrote extensively on game birds and mammals and was the author of the first book on "Game Management."

LEON J. COLE, geneticist and ornithologist, died February 17, 1948, at Madison, Wisconsin, aged seventy. Born at Allegany, New York, he attended Michigan State College and the University of Michigan and earned the Ph.D. in zoology at Harvard. He had carried on field work in Alaska, Bermuda, Yucatan, Tortugas, and Europe. Ornithologists will always remember that it was he who (in 1901) first publicly proposed in America that birds should be banded and, during the following ten years, led the movement for organized bird banding.

ORNITHOLOGICAL NEWS

Herbert Deignan, of the National Museum, is in Australia as ornithologist with a joint expedition under the auspices of the National Geographic Society and the Australian Government. Plans for the expedition included a survey of Arnhemland, northern Australia.

Seth H. Low has been transferred from his position as Manager of the Salt Plains National Wildlife Refuge to take charge of the bird-banding program of the Division of Wildlife Research, U. S. Fish and Wildlife Service.

Emerson Stringham (P.O. Box 986, Kerrville, Texas) is preparing a monograph on Alexander Wilson and is interested in procuring all books and papers by or about Wilson. He will be glad to hear from Members who wish to dispose of such books or papers or who know where they may be procured.

Frederick V. Hebard (1500 Walnut Street Building, Philadelphia 2, Pennsylvania) is making a study of "injury feigning" in all species of North American birds. He would like to receive detailed reports from Members on their own observations of such displays.

THE LOUIS AGASSIZ FUERTES RESEARCH GRANT FOR 1948

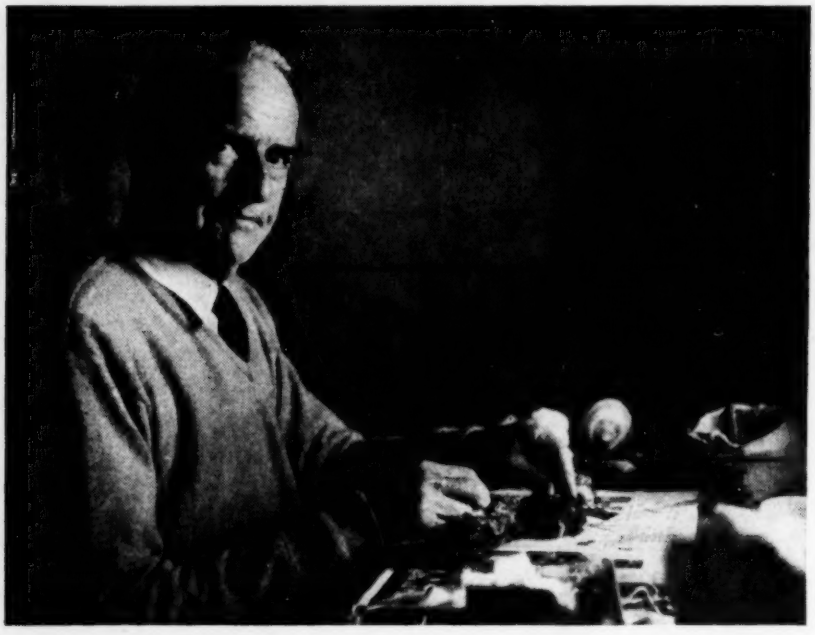
The Louis Agassiz Fuertes Research Fund was established to encourage ornithological research. The grant is designed to help students and amateur ornithologists in defraying the expenses of their research programs, particularly such items as travel, materials, and equipment.

One hundred dollars is given each year to the applicant selected by the Research Committee of the Wilson Ornithological Club on the basis of (1) merits of the applicant's project; (2) prospects of successful completion of the project; (3) ability of the applicant; and (4) financial need of the applicant.

All members of the Wilson Ornithological Club and all members of its Affiliated Societies are eligible for the grant.

Applications should be sent before October 1 to Dr. John T. Emlen, Jr., Chairman of the Research Committee (Zoological Department, University of Wisconsin, Madison 6, Wisconsin). Dr. Emlen will supply application forms on request, or the applicant may supply the following information in a letter: Name, address, and age; ornithological training and experience (but note that no formal training is required as a basis for eligibility); subject of investigation (title, objectives, and scope of project; plan of procedure; progress to date); supervisor or consultant, if any; ways in which the money would be used; financial need. A letter of endorsement by some well-known ornithologist or zoologist is desirable but not required. Applications which fail to win the grant in any given year may be re-submitted in following years if desired.

NEW LIFE MEMBER



WILLIAM H. PHELPS, the leader in Venezuelan ornithology and Research Associate on the staff of the American Museum of Natural History, was born in New York City in 1875. While at Harvard he was active in the Nuttall Ornithological Club and spent the summer of his junior year in Venezuela collecting birds. The results of this expedition, written in collaboration with Frank M. Chapman, were published in the *Auk* in 1897. After graduation Mr. Phelps established himself in business in Venezuela. Forty years later, in 1937, he retired from business, built a museum in the garden of his house in Caracas, and devoted himself to the study of Venezuelan birds. The Museum has a staff of four: a Curator, his assistant, and two collectors. William H. Phelps, Jr., works with his father on the collection and for several years has led the more difficult expeditions. The Phelps Collection now comprises 43,000 specimens, and more than a hundred new birds have been described from it. Mr. Phelps' many papers on Venezuelan birds constitute a major contribution to South American ornithology.

ORNITHOLOGICAL LITERATURE

FIELD GUIDE TO BIRDS OF THE WEST INDIES. By James Bond. Illustrated by Earl Poole. Macmillan Company, New York, 1947: 4⅞ × 7⅜ in., ix + 257 pp., col. frontispiece, 211 drawings. $3.75.

Bond's latest work on West Indian birds is based on his well-known "Birds of the West Indies" (Acad. Nat. Sci. Phila., 1936), but the text has been completely rewritten and abridged, and the new volume is definitely not a second edition. The detailed descriptions in the predecessor volume are reduced to a few lines of general description with particular emphasis on field marks; the ranges are stated in less detail. On the other hand, the accounts of the haunts, notes, and habits have been expanded, and a general statement of each bird's status is appended—helpful features not to be found in the earlier volume. Poole's line drawings which illustrated the 1936 work are again used, with numerous new ones as well, bringing the total number of species figured to over 210.

The use of Bond's field guide, which has no keys of any kind, naturally assumes that the student is able to place in their proper families the birds seen and then run down the specific identification by comparison with the drawings and a perusal of the appropriate text. North American migrants and wide-ranging water birds known to occur in the West Indies are included, as well as the endemic species, and Bond himself suggests in the introduction that one of the recent standard North American bird guides can be employed as a useful adjunct by visitors to the Caribbean. A short statement preceding each family, of the type used by Mayr in his recent "Birds of the Southwest Pacific," would facilitate placing of birds in their proper families by the less experienced observers, but this suggestion is not intended to be a criticism of what promises to be a most useful and convenient popular bird guide.—J. L. Peters.

THE BIRDS OF BREWERY CREEK. By Malcolm MacDonald. Oxford University Press, Toronto, Canada, 1947: 9 × 6⅛ in., x + 334 pp., 23 photographs (7 in color). $5.00.

However busy he may have been as High Commissioner for the United Kingdom in Canada, The Right Honourable Malcolm MacDonald put his early morning hours to good use. This book, of engaging and disarming charm, contains no little factual material. Clever interweaving of first-hand observations and recounted incidents has made a highly readable narrative of bird life. Certainly it is one that can be read with pleasure and much profit by laymen and with pleasure and probably some profit by most ornithologists.

Launching the account with a description of the area and a chapter devoted to "A Bird's Year," Mr. MacDonald continues with a report of his observations, arranged chronologically, by months. From a birdless first day in the field to a final accounting of 160 species, he writes of many varied incidents—and with great freshness of viewpoint.

The outstanding feature of the book is the easy cadences, which permit whimsical analogy to follow straight reporting. Without assuming the "sloppy sentimentality" of which Mr. MacDonald warns, it still is fun to picture his Red-wing as an Admiral complete with epaulets, or his Robin as a General in ceremonial dress. Too, one cannot help cheering him in the role of Matchmaker MacDonald during his encounter with the amorous Buffle-heads.

His life-history reports show remarkably fine powers of observation. Accounts of the Flicker, Catbird, Oriole, and particularly of the Spotted Sandpiper are exceedingly well handled. He proposes a very logical theory regarding the "decoy"

antics, or distraction display, of the Spotted Sandpiper as being related to the courtship display but later presents new evidence, thus leaving the matter open to more observation.

The book includes 23 photographs (some in color) by Arthur A. Allen and W. V. Crich. These are related only in that the birds portrayed are named in a quoted line of the text. Excellent photographs all, those in color being reproduced about as successfully as the present use of this process will allow, but the black and white ones suffer from a toning which robs them of a good deal of character.

The book is carefully indexed, so that one may follow all the material relating to a particular species. Some typographical errors do not appreciably detract from an otherwise finely produced book.—Rosario Mazzeo.

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See also *Anatomy:* Hudson, Portmann. *History . . . and Institutions:* White.

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* Loose-sheet reprints of this section have been available for the convenience of Members who clip the titles and paste them on cards for permanent reference files, but the number of requests received for these has not covered the printing cost. Unless additional Members wish to subscribe, reprinting the section must be discontinued. Two sets of the Bibliography (one for author and one for subject-file) can be supplied for fifty cents a year. Members are asked to send to the Editor new orders and to confirm standing orders before September. Double sets for past years (1941–47) are available at forty cents per year.

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See also *Distribution and Taxonomy:* Hering. *Ecology:* Glegg.

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REPORT OF THE SECRETARY FOR 1947

As of the date of this report, the Wilson Ornithological Club has 1,562 Members, the highest number the Club has ever attained. During 1947 we gained 372 Members and lost, from all causes, 111—a net gain of 261 Members.

One of the 372 new Members is a Life Member; the others are divided as follows: Sustaining Members, 14; Active Members, 100; Associate Members, 257.

The total present membership, by classes, with corresponding figures for 1946 in parentheses, is:

Founders	2	(2)
Life Members	57	(44)
Sustaining Members	106	(72)
Active Members	557	(449)
Associate Members	840	(734)

During the year, Walter F. Scott did a splendid job as Chairman of the Membership Committee in offering to great numbers of persons the opportunity to join the Club, and he is to be congratulated on his fine work.

We now have Members resident in every State in the Union, in most of the Provinces of Canada, and in many foreign countries. Although not a complete membership tally by State and country, the following list gives the geographical distribution of the majority of our Members: California, 61; Illinois, 90; Indiana, 31; Iowa, 50; Massachusetts, 54; Michigan, 113; Minnesota, 54; Missouri, 40; New Jersey, 27; New York, 134; Ohio, 153; Pennsylvania, 71; Wisconsin, 86; Canada, 59.

Your new Secretary has enjoyed his work and was particularly impressed by the splendid cooperation given him by the other Officers and the Members.

All of the statistics of membership contained in this report were furnished by our Treasurer, Burt L. Monroe. With so large a membership, it requires a tremendous amount of labor to keep records of the Members clear and up to date, and the Treasurer's generous donation of time and effort deserves the commendation of the entire membership.

Respectfully submitted,

December 31, 1947. James B. Young, *Secretary*.

REPORT OF THE AFFILIATED SOCIETIES COMMITTEE FOR 1947

During the past year there have been no new affiliations with the Club, and it would seem that it is time to consolidate the affiliations already existing and to seek new ways to increase their value.

The Louis Agassiz Fuertes Research Grant, for which Members of the Affiliated Societies, as well as Members of the Wilson Ornithological Club, are eligible, is one bond of union already established.

It was gratifying to have many members of our most recent affiliate, the Brooks Bird Club of West Virginia, taking an active part in the 1947 Annual Meeting. It augurs well that the next Annual Meeting is to be held in association with another of our affiliates, the Wisconsin Society for Ornithology.

We would like to see such things as active exchange of visitors, journals, program ideas, cooperation in research projects, and joint action on conservation matters develop between the affiliates and our Club. Suggestions are invited from Members of the Club and from Members of the Affiliated Societies.

Respectfully submitted,

December 31, 1947. Gordon M. Meade, M.D., *Chairman*.

REPORT OF THE ILLUSTRATIONS COMMITTEE FOR 1947

During 1947, this Committee carried on considerable correspondence in attempts to procure good photographs as illustrations for *The Wilson Bulletin*, and the Chairman prepared the distribution map to illustrate C. L. Broley's article, "The Migration and Nesting of Florida Bald Eagles," that appeared in the March issue of the *Bulletin*, as well as a sketch map used with Angus Gavin's paper on the birds of Perry River District, published in the December issue.

The Committee communicated with about 35 bird artists regarding the donation of pictures for the auction held at the 1947 Annual Meeting for the benefit of European ornithologists. The results of the auction are given in the Treasurer's report.

The Committee is still on the lookout for outstanding photographs of either rarely photographed birds or particularly interesting shots of better known birds for use in *The Wilson Bulletin*.

Respectfully submitted,

December 31, 1947. W. J. Breckenridge, *Chairman*.

REPORT OF THE TREASURER FOR 1947

Balance as shown by last report, dated Dec. 31, 1946		$ 37.35
Receipts, Jan. 1 to Dec. 31, 1947		
Dues:		
Associate	1635.65	
Active	1674.00	
Sustaining	535.00	
Subscriptions to *The Wilson Bulletin*	205.50	
Sale of back issues of *The Wilson Bulletin* and of reprints	258.83	
Interest from Endowment Fund	147.94	
Proceeds of auction of paintings for relief of European Ornithologists	1058.00	
Contributions to Library Book Fund	11.10	
Gifts; miscellaneous receipts	5.74	
Total receipts		$5569.11
Disbursements		
The Wilson Bulletin: printing, engraving, mailing	$2672.83	
Purchase of back issues of *The Wilson Bulletin*	65.00	
President's expense: printing, postage	22.33	
Editor's expense: reprints, postage, secretarial aid	352.48	
Secretary's expense: stationery, postage, clerical aid	394.47	
Treasurer's expense: stationery, postage, clerical aid	80.61	
Membership Committee's expense: postage, printing	418.57	
Contribution to European Ornithologists Relief Fund	1068.00	
Purchase of books for Library	7.00	
Bank charges; foreign exchange, corporation papers, bond of Treasurer, and miscellaneous expenses	17.43	
Annual meeting expense	290.18	
Total disbursements		$5388.90
Balance on hand in Citizens Fidelity Bank and Trust Co., Louisville, Kentucky	180.21	
		$5569.11

LOUIS AGASSIZ FUERTES RESEARCH GRANT FUND (special gift) ..$ 600.00

ENDOWMENT FUND

Cash balance in savings account, Dec. 31, 1946		$1337.38
Received during year:		
Interest on U. S. bonds and on savings account	147.94	
Life Membership payments	1375.00	
Total		$2860.32
Transferred to checking account (interest)	147.94	
Purchase of U. S. Savings Bonds, Series F, dated Feb. 1, 1947	1480.00	
Bank charge (State tax)	.94	
Total		$1628.88
Balance		$1231.44
Bonds:		
U. S. Postal Savings Coupon Bonds, dated July 1, 1935		$ 780.00
U. S. Savings Bonds, Series C, dated Aug. 1, 1938 (maturity value, $1075.00)		1032.00
U. S. Savings Bonds, Series G, dated Sept. 1, 1943 (maturity value, $1000.00)		947.00
U. S. Savings Bonds, Series G, dated Dec. 20, 1944 (maturity value, $1500.00)		1426.50
U. S. Savings Bonds, Series G, dated July 1, 1945 (maturity value, $900.00)		860.40
U. S. Savings Bonds, Series G, dated Oct. 1, 1945 (maturity value, $1400.00)		1346.80
U. S. Savings Bonds, Series F, dated Feb. 1, 1947 (maturity value $2000.00)		1480.00
Total Endowment Fund		$9104.14

Note: Bonds are listed at their present redeemable value.

Respectfully submitted,

December 31, 1947. Burt L. Monroe, *Treasurer*.

Approved by Auditing Committee

Russel Burget
Harold Wing

REPORT OF THE MEMBERSHIP COMMITTEE FOR 1947

At the beginning of the calendar year of 1947 the Wilson Ornithological Club had a total of 1,301 Members. An organized campaign was planned to invite interested bird students to join the Club. To begin this campaign, more than 100 Members voluntarily nominated some 300 of their acquaintances interested in ornithological subjects. Sending invitations to this group was the first job of the Membership Committee. During the period of the active campaign, which started about April 20, approximately 5,000 invitations to membership were sent out by the Committee, which included 15 members distributed throughout the country. The present membership figures, with the corresponding figures for 1946, are given in the report of the Secretary.

The Chairman of the Committee wishes to thank all of the Members of the Club who assisted in this campaign. Special thanks are due to the Officers of the Club for their timely advice and assistance, and especially to the members of the Committee, among whom the following did outstanding work: Rev. John W. Baechle, Indiana; Mrs. Doris H. Speirs, Ontario; David Damon, Nebraska; Eugene Eisenmann, New York; C. J. Henry, North Dakota; and Henry Parker, Massachusetts.

Respectfully submitted,

December 31, 1947. Walter E. Scott, *Chairman.*

WILSON ORNITHOLOGICAL CLUB APPOINTMENTS FOR 1948

The President has appointed the following to serve during 1948:

Committees—

Membership Committee. Dorothy M. Hobson, *Chairman.* Seth H. Low, *Vice-Chairman.* George H. Breiding, David Damon, Eugene Eisenmann, S. B. Heckler, C. J. Henry, Samuel W. Lesher, Arthur B. Mickey, W. E. Scott, Doris H. Speirs, Leonard Wing, Merrill Wood.

Affiliated Societies Committee. Charles L. Conrad, *Chairman.* Gordon M. Meade, Member-at-large; Russell DeGarmo (Brooks Bird Club); J. Fred Denton, Jr. (Georgia Ornithological Society); O. A. Stevens (Inland Bird-Banding Association); Leonard C. Brecher (Kentucky Ornithological Society); Adrian C. Fox (Nebraska Ornithologists' Union); James T. Tanner (Tennessee Ornithological Society); J. J. Murray (Virginia Society of Ornithology); Clarence S. Jung (Wisconsin Society for Ornithology).

Wildlife Conservation Committee. H. Albert Hochbaum, *Chairman.* John M. Anderson, Clarence Cottam, Harrison F. Lewis.

Illustrations Committee. Terence M. Shortt, *Chairman.* Walter J. Breckenridge, Richard P. Grossenheider, Hal H. Harrison, Karl H. Maslowski, Robert M. Mengel, Roger Tory Peterson.

Endowment Fund Committee. Harold F. Wing, *Chairman.* Mrs. Herbert E. Carnes, Fred T. Hall.

Library Committee. Harold F. Mayfield, *Chairman.* Edward F. Dana, Arthur E. Staebler, Rowland S. Wilson.

European Relief Committee. Frances Hamerstrom, *Chairman.* John T. Emlen, Jr., Theodora G. Melone, Carl Welty.

Louis Agassiz Fuertes Research Grant Committee. John T. Emlen, Jr., *Chairman.* George H. Lowery, Jr., Ernst Mayr, Margaret M. Nice, Frank A. Pitelka, Josselyn Van Tyne.

Local Committee on Arrangements for the Thirtieth Annual Meeting. John T. Emlen, Jr., *Chairman.* Nicholas E. Collias, Frederick Greeley, James B. Hale, J. J. Hickey, Robert A. McCabe, A. W. Schorger, Walter E. Scott, Daniel Q. Thompson, Donald R. Thompson, Harold R. Wolfe, Howard Young, Fred R. Zimmerman.

Program Committee. James B. Young, *Chairman.* Harold F. Mayfield, Josselyn Van Tyne.

Representative of the Wilson Ornithological Club on the American Ornithologists' Union Council—Burt L. Monroe.

Trustees of the Club, appointed by Past President George Miksch Sutton, with their terms of office, are as follows: James Henry Bruns (1947–49), R. Allyn Moser (1947–48), A. W. Schorger (1948–50).

REPORT OF THE LIBRARY COMMITTEE FOR 1947

This Committee conceives its purpose to be dual: to increase the resources of the Wilson Ornithological Club Library and to make sure that the Library's facilities are known to all Members of the Club. During 1947 the Committee has directed its efforts toward this end.

Although a number of Members have been very generous in their donations to the Library, special mention should be made of the recent contributions of two men: 51 books and 372 bulletins and reprints, donated by Lynds Jones; Beebe's monumental 4-volume "Monograph of the Pheasants" (1918–22), donated by Herbert L. Stoddard. Total donations to the Library, as reported in the four *Bulletins* of 1947, are: bulletins and reprints, 867; books, 76.

In the June 1947 *Bulletin* appeared an announcement of a Book Purchase Fund to which Members might contribute for the purchase of recently published books for the Library. Contributions to this fund in recent months have made possible the purchase of "Darwin's Finches" (1947), by David Lack, and "Modern Bird Study" (1945), by Ludlow Griscom.

The Committee would like to enlist the assistance of all interested Club Members in writing people who have books and reprints suitable for the Library.

The Committee acknowledges the help it has received from the Officers of the Club, particularly from the Editor of the *Bulletin*.

Respectfully submitted,

December 31, 1947 Harold F. Mayfield, *Chairman*.

THE WILSON ORNITHOLOGICAL CLUB LIBRARY

The following gifts have been recently received. From:

Elizabeth B. Beard—3 reprints
Ralph Beebe—16 magazines
Adrian C. Fox—2 reprints
Ludlow Griscom—61 reprints
Fr. Haverschmidt—7 reprints
Haven Kolb—7 bulletins
Amelia R. Laskey—9 reprints
George H. Lowery, Jr.—9 reprints
Robert A. McCabe—1 periodical (6 vol. set)
Harold Mayfield—1 book
Rosario Mazzeo—1 book
Robert M. Mengel—11 reprints
D. S. Miller—11 magazines
Margaret M. Nice—1 book
Eugene P. Odum—7 reprints
Walter E. Scott—1 bulletin, 3 journals
W. E. Clyde Todd—9 reprints
Wilson Tout—1 book
Josselyn Van Tyne—2 books, 2 bulletins
Lawrence H. Walkinshaw—2 reprints
K. A. Wodzicki—7 reprints

Among the recent gifts are Trelease and Yule's "Preparation of Scientific and Technical Papers" (3rd ed., 1936); Fr. Haverschmidt's "Faunistisch Overzicht van de Nederlandsch Broedvogels" (1942); and a number of standard State and local lists, as well as the new "Lincoln County [Nebraska] Birds" by Wilson Tout (1947). Also included are several recently published non-technical books on birds: Malcolm MacDonald's "The Birds of Brewery Creek" (1947); J. J. Murray's "Wild Wings" (1947); H. H. Kopman's "Wild Acres" (1946); R. M. Saunders' "Flashing Wings" (1947); and Phyllis Barclay-Smith's "Garden Birds" (1946), with its splendid reproductions of some of the Gould plates.

With the Book Purchase fund, the Library Committee has purchased Griscom's "Modern Bird Study" (1945) and David Lack's "Darwin's Finches" (1947).

Information on the use of the Library will be found on the inside front cover of each issue of *The Wilson Bulletin*.

REPORT OF THE LOUIS AGASSIZ FUERTES RESEARCH GRANT COMMITTEE

The Research Committee of the Wilson Ornithological Club has been functioning since its formation in March 1947 with appointments made by President Sutton. The first formal meeting of the Committee was held in Columbus on November 28, 1947.

An announcement of the Fuertes Research Grants, provided through the generosity of an anonymous friend of the Club, was made in the March 1947 issue of *The Wilson Bulletin*. Five applications were received in response to this announcement. These applications were reviewed by members of the Committee and rated on the basis of: a) merits of the project, b) prospects of successful completion of the project, c) displayed or reported ability of the applicant, and d) financial need of the applicant. After due consideration of several excellent applications the award for 1947 was granted to Mr. Leonard Mewaldt, a graduate student at Montana State University, in recognition of, and for use in, his studies of the life history of Clark's Nutcracker.

November 29, 1947 John T. Emlen, *Chairman*

NEW LIFE MEMBERS

Douglas Scott Miller, of Toronto, Canada, has been a member of the Wilson Ornithological Club since 1939. After spending three years overseas as a member of the Royal Canadian Air Force, he assisted in the Department of Lands and Forests Research Division and studied for a time at the University of Toronto. He is now in the Wildlife Division of the Department of Lands and Forests.

Margaret D. Feigley, a member of the Wilson Ornithological Club since 1944, teaches biology and social studies in the Skokie Junior High School, Winnetka, Illinois. She received the B.S. degree from the University of Minnesota, the Master's from the University of Michigan. She is an active supporter of several scientific societies and is particularly interested in the conservation of our bird population.

LITERATURE FOR EUROPEAN ORNITHOLOGISTS

The following communication has been received from the American Ornithologists' Union Relief Committee:

Numerous requests for ornithological reprints and bird books have recently come to this country from European ornithologists who have lost their entire libraries in consequence of the war. The desire for ornithological literature among these colleagues (bird lovers as well as professional ornithologists) seems to be as great as that for food and clothing. Perhaps you have a dozen or two extra reprints of some of your papers which you could spare. Papers dealing with any aspect of the general biology of birds, particularly life-history studies, are especially welcome. It would be much appreciated if you would mail such reprints to Ernst Mayr, American Museum of Natural History, Central Park West at 79th Street, New York 24, New York, to Frank A. Pitelka, Museum of Vertebrate Zoology, Berkeley 4, California, or to J. J. Hickey, 424 University Farm Place, Madison 6, Wisconsin.

Please mark packages "A.O.U. Relief Committee." All reprints so received will be distributed at once among active European bird students.

THE WILSON BULLETIN PUBLICATION DATES

The actual dates of publication of the four numbers in 1947 were: April 24, June 30, September 30, December 24.

TO OUR CONTRIBUTORS

Our members are asked to submit articles for publication in the *Bulletin*. Manuscripts will be accepted only with the understanding that they have not previously been published or accepted for publication elsewhere.

MANUSCRIPT. Manuscripts should be typed, with double-spacing and wide margins, on one side of white paper of good quality and of standard size (8½ x 11). The title should be brief and should indicate the subject clearly. Ordinarily the scientific names of the birds treated should be given and should appear early in the article. Most articles should conclude with a brief summary.

BIBLIOGRAPHY. Literature referred to in the text should be cited by author's name, year of publication, and exact page of the particular reference. Such literature should ordinarily be listed in full at the end of the paper.

ILLUSTRATIONS. Photographic prints, to reproduce well as half-tones, should have good contrast and detail. Please send prints unmounted, and attach to each print a brief but adequate legend. Do not write heavily on the backs of photographs.

PROOF. Authors are requested to return proof promptly. Expensive alterations in copy after the type has been set must be charged to the author.

REPRINTS. Orders for reprints, which are furnished to authors at cost, should accompany the returned galley proof.

REPRINT SCHEDULE OF THE WILSON BULLETIN

	1 page	2 pp.	4 pp.	8 pp.	12 pp.	16 pp.	Each additional 4 pp.
100 copies	$3.05	$4.28	$5.65	$7.39	$8.95	$9.71	$1.33
Each additional 100 copies	$1.49	$2.00	$2.83	$3.75	$4.61	$5.48	.86

Covers: $5.04 for first 100 copies; $2.60 for each additional 100 copies.
Charge will be made for a minimum of 100 reprints.

Authors are asked not to pay for reprints before receiving an itemized bill from the press.